

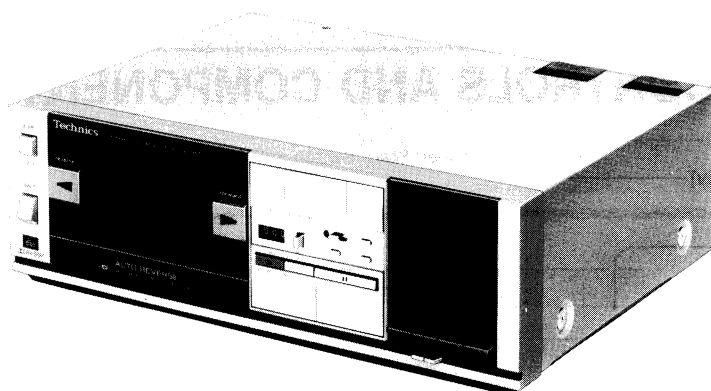
Service Manual

Cassette Deck

315 Series Mini-Size Auto Reverse
Cassette Deck with dbx System

RS-8R

(Silver Face)
(Black Face)



RS-8R in black is also available in some countries.

This is the Service Manual for the following areas.

- ☐ For all European areas except United Kingdom.
- ☐ For United Kingdom.
- ☐ For Asia, Latin America, Middle East and Africa areas.
- ☐ For Asian PX.
- ☐ For European PX.

RS-8R MECHANISM SERIES

Specifications

Track system:	4-track 2-channel stereo recording and playback	Inputs:	MIC; sensitivity 0.25mV, applicable microphone impedance 400Ω—10kΩ
Tape speed:	4.8cm/s		LINE; sensitivity 60mV, input impedance 47kΩ or more
Wow and flutter:	0.05% (WRMS), ±0.14% (DIN)	Outputs:	LINE; output level 400mV, output impedance 1.5kΩ or less
Frequency response:	Metal tape; 20—17,000 Hz 30—16,000 Hz (DIN) 50—15,000 Hz±3dB CrO ₂ tape; 20—17,000 Hz 30—16,000 Hz (DIN) 50—14,000 Hz±3dB Normal tape; 20—16,000 Hz 30—15,000 Hz (DIN) 50—13,000 Hz±3dB	Bias frequency:	80kHz
Dynamic range:	110dB (at 1kHz) with dbx in	Heads:	2-head system 1-AX (AMORPHOUS) head for record/playback 1-double-gap sendust head for erasure
Max. input level		Motor:	Electrical governor motor (×1), DC motor (×2)
improvement:	10dB or more improved with dbx in (at 1kHz)	Power requirements:	☐ 3-motor system ☐ 2-motor system ☐ AC; 220V, 50-60Hz ☐ AC; 110/125/220/240V, 50-60Hz
Signal-to-noise ratio:	dbx in; 92dB Dolby B NR in; 67dB (CCIR) NR out; 57dB (Signal level = max. input level A weighted, CrO ₂ type tape)	Pre-set power voltage;	☐ 240V ☐ 125V ☐ 220V
Fast forward and		Power consumption:	12W
rewind time:	Approx. 100 seconds with C-60 cassette tape	Dimensions:	31.5cm(W)×9.9cm(H)×23.9cm(D)
		Weight:	3.8kg

Design and specifications are subject to change without notice.

* The term dbx is a registered trademark of dbx Inc.

** 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

Technics

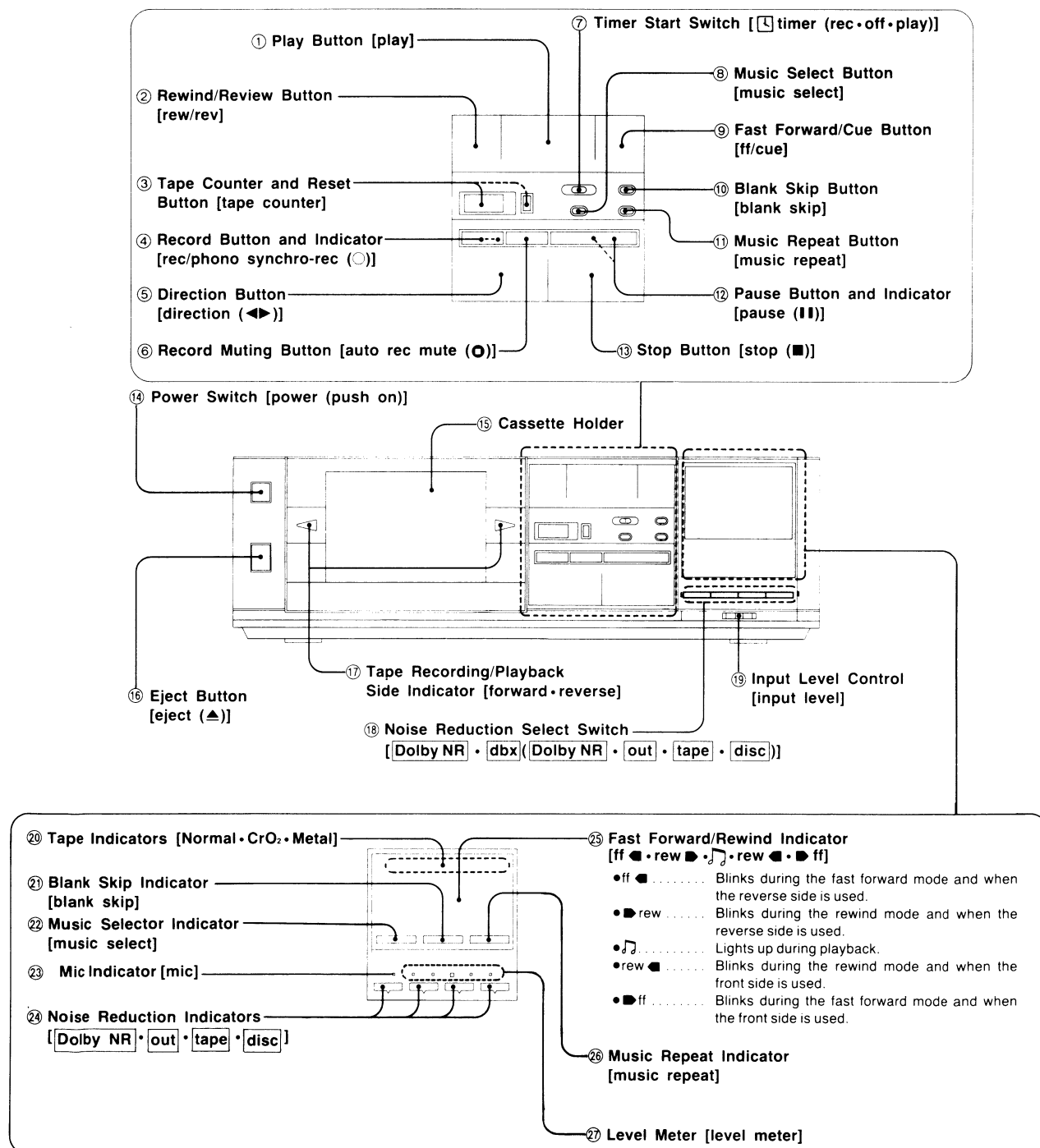
Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

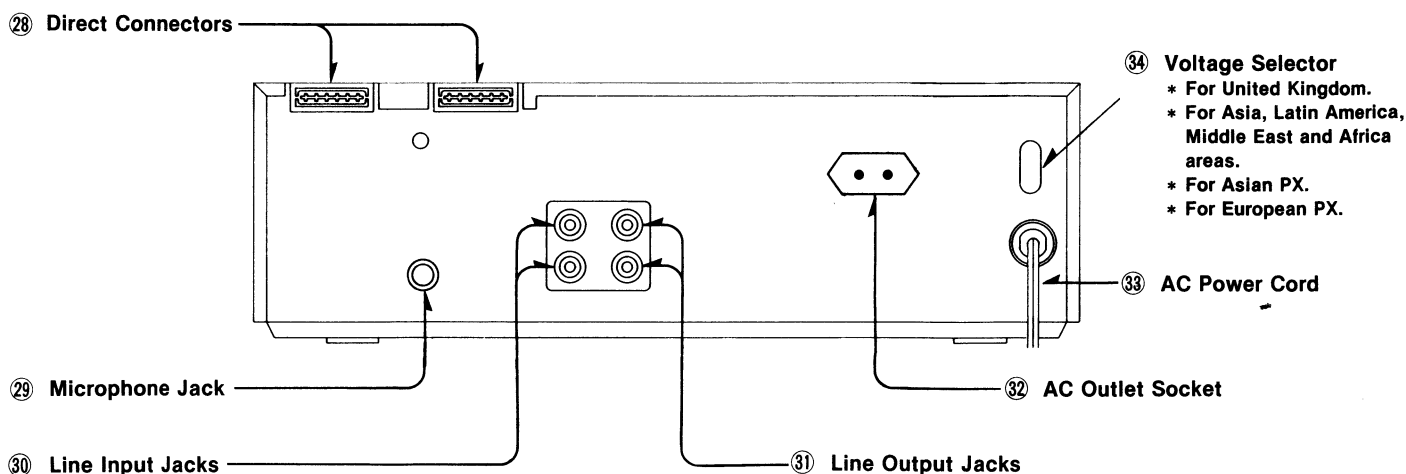
Panasonic Tokyo
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LOCATION OF CONTROLS AND COMPONENTS





OPERATING INSTRUCTION

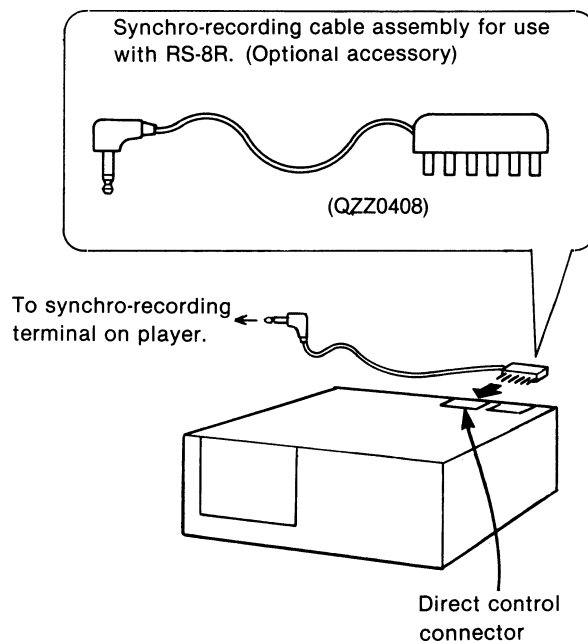
1. About Synchro-recording

Why use synchro-recording?

When the tape deck's Record Button is pushed, and the deck placed in the record-pause condition, when the stylus of the tonearm is lowered onto the record surface, the Pause mode will be automatically released and recording will begin. When the stylus leaves the surface of the record, approximately four seconds of non-recorded interval will be allowed to pass before the recording stops automatically. This function is called synchro-recording.

NOTE:

For synchro-recording with a system provided with no direct control connector, an optional synchro-recording cable assembly, QZZ0408, is required.



INTERCONNECTING

2. The Reverse Function

The front side (visible side) or the reverse side can be played back without having to turn the cassette tape around.

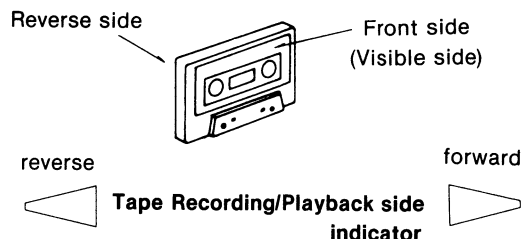
Repeat automatic reverse

When the tape has wound to the hub during playback, the repeat automatic reverse mechanism operates and the tape playback side is automatically changed.

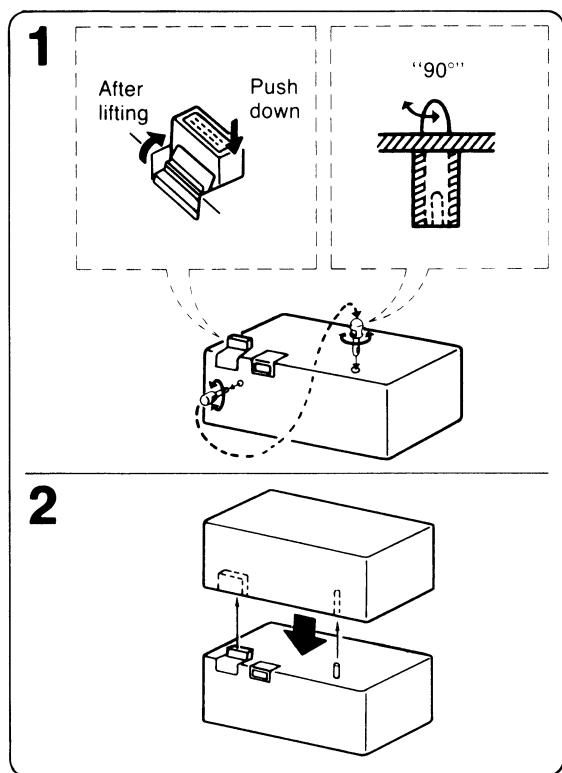
Until the Stop Button is pressed, the front side changes to the reverse side, the reverse side to the front side. The operation is repeated 8 times and then automatically stops.

Manual reverse

The cassette tape playback side can be changed freely using the Direction Button.



FOR CONNECTION WITH THE DIRECT CONNECTOR



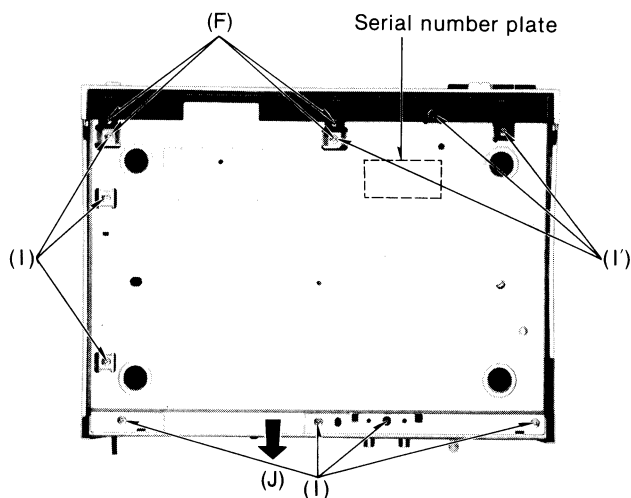
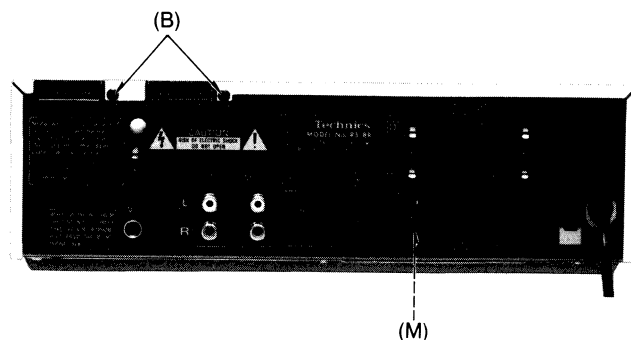
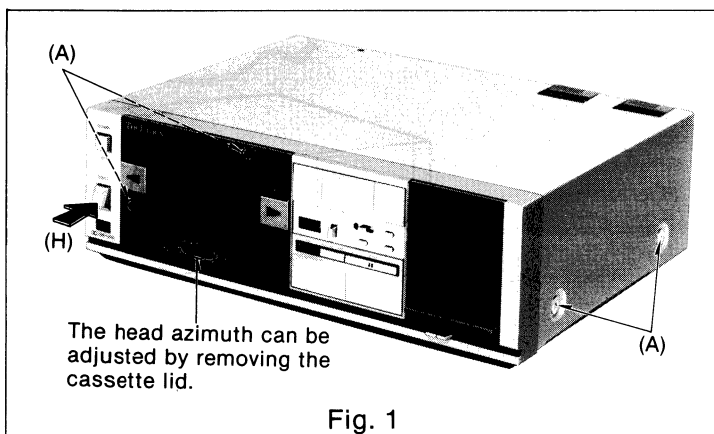
1. For connection with the direct connector:

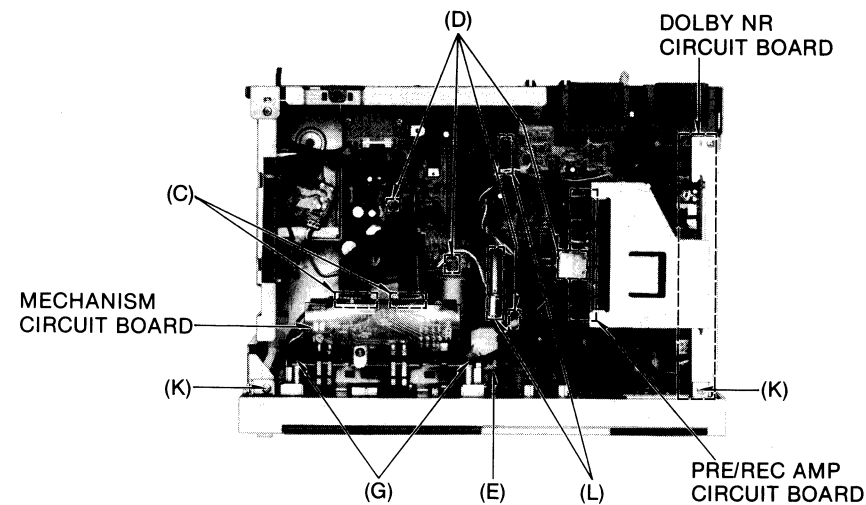
- Connection can be made without using the stereo pin cords when the unit and TECHNICS' Stereo Amplifier and FM/AM tuner with the direct connector are stacked up for use.
- Set the direct connector to the erect position, replace the stabilizing pin at the unit's rear panel on the unit's top and connect the stereo amplifier properly (the stabilizing pin can be removed by rotating it 90°).

Notes:

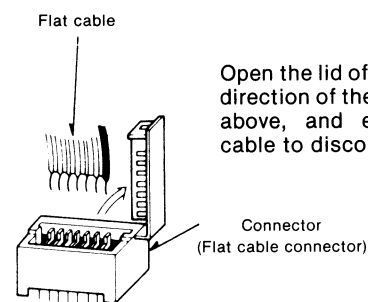
- The stereo pin cords must be detached when connection is made using the direct connector.
- Do not shake or twist the components since they will unnecessarily strain the direct connector and stabilizing pin and may damage them in the process.

DISASSEMBLY INSTRUCTIONS



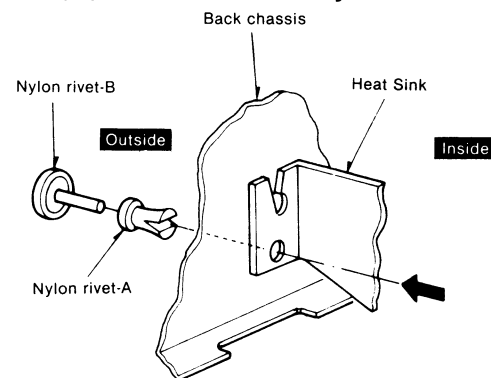


(C), (L) How to remove flat cable



Open the lid of connector in the direction of the arrow as shown above, and extract the flat cable to disconnect.

(M) How to remove nylon rivet



To remove a heat sink from the back chassis, first press nylon rivet-A from the inside in the direction indicated by the arrow as shown above, and extract the rivet to the outside. Next remove nylon rivet-B from the outside. Consequently, the heat sink can be removed from the back chassis.

Fig. 4

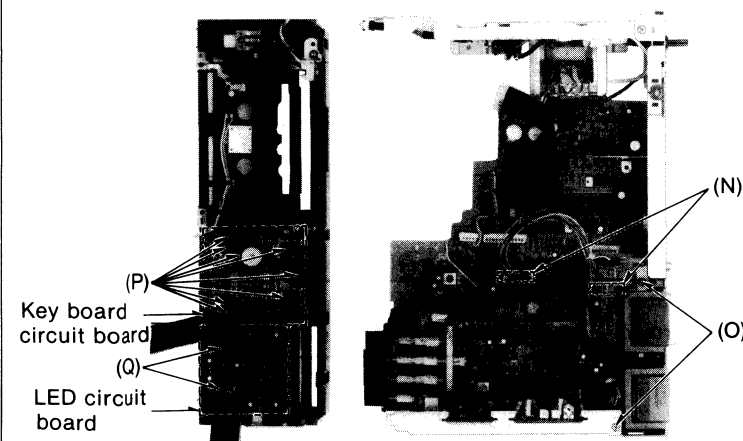


Fig. 5

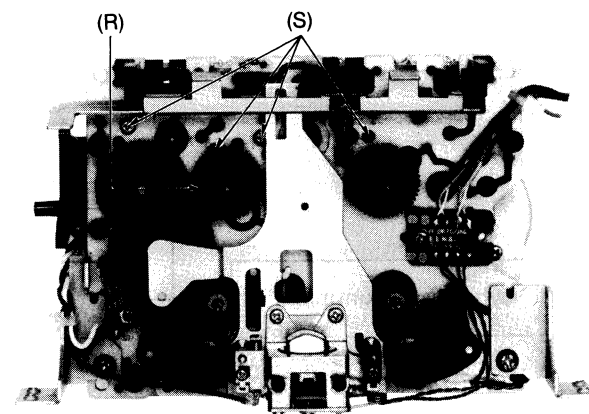


Fig. 6

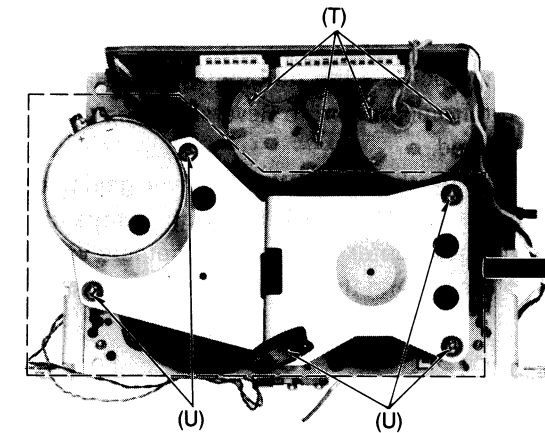


Fig. 7

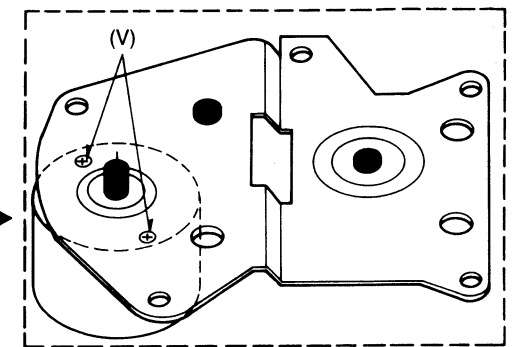


Fig. 8

Ref. No.	Procedure	To remove —.	Remove —.	Shown in fig. —.
1	1	Case cover	• 4 screws(A) • 2 screws(B)	1 2
2	1 → 2	Mechanism unit	• How to remove flat cable(C) • Pull the connector(D) • Remove the counter belt(E) • 4 screws(F) • 2 screws(G) • Push the eject button(H)	4 4 4 3 4 1
3	3	Bottom cover assembly	• 10 screws(I)(I') • Slide the bottom cover assembly in the direction of arrow (J) and remove it.	3 3
4	1 → 2 → 4	Front panel assembly	• 3 screws(I') • 2 screws(K) • How to remove flat cable(L)	3 4 4
5	1 → 2 → 3 → 4	Main circuit board, DOLBY NR circuit board and Pre/Rec AMP circuit board	• How to remove nylon rivet(M) • Pull the connector(N) • 2 screws(O)	2, 4 5 5
6	1 → 2 → 4 → 6	Key board circuit board	• 8 screws(P)	5
7	1 → 2 → 4 → 7	LED circuit board	• 2 screws(Q)	5
8	1 → 2 → 8	FF/REW motor and Driver motor	• Remove the reel table(R) • 4 screws(S) • Unsolder the soldered portion of the FF/REW motor terminal and driver motor terminal(T)	6 6 7
9	1 → 2 → 8	Capstan motor	• 5 screws(U) • 2 screws(V)	7 8

* Serial No. Indication.

The serial number plate of this product is attached to the bottom cover (shown in Fig. 3).

TECHNICAL EXPLANATION

Tape End Detection Mechanism

In addition to the manual direction switching means, RS-8R also incorporates the Automatic Tape Reversing mechanism that automatically reverses the directions of the tape run from Forward to Reverse or from Reverse to Forward at the tape end only when the playback operation is entered.

In the RS-8R mechanism the Takeup Reel Table is directly driven by the FF/REW Motor via gears, thus eliminating any slip otherwise may be caused by friction. Due to this, as soon as the Reel Table stops at the tape end position, the FF/REW Motor stops its revolution. The microcomputer IC14 AN6270 detects variable noise appearing through the power line while the FF/REW Motor rotates. And then this signal actuates either the Auto-stop or AUTO reverse.

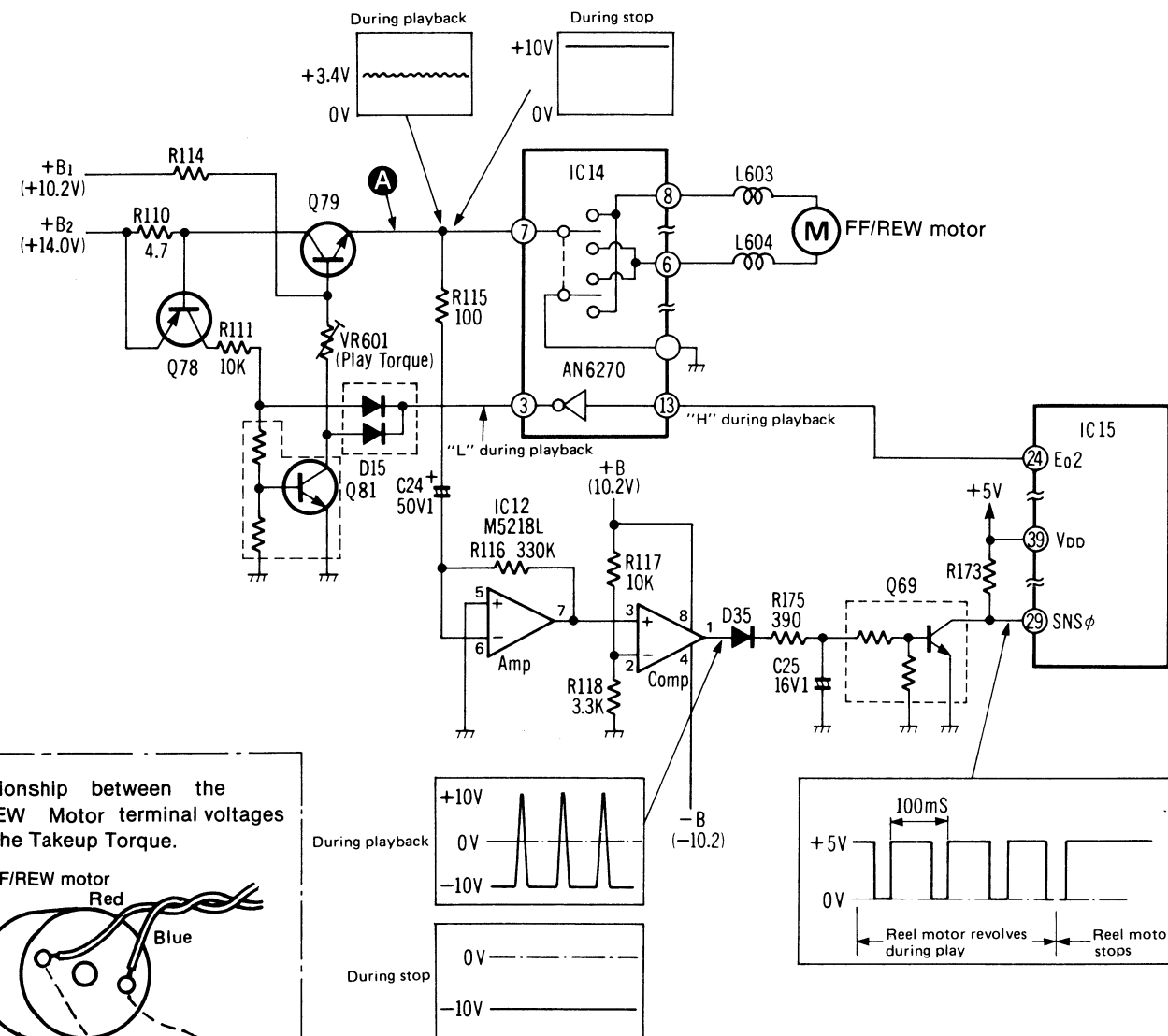
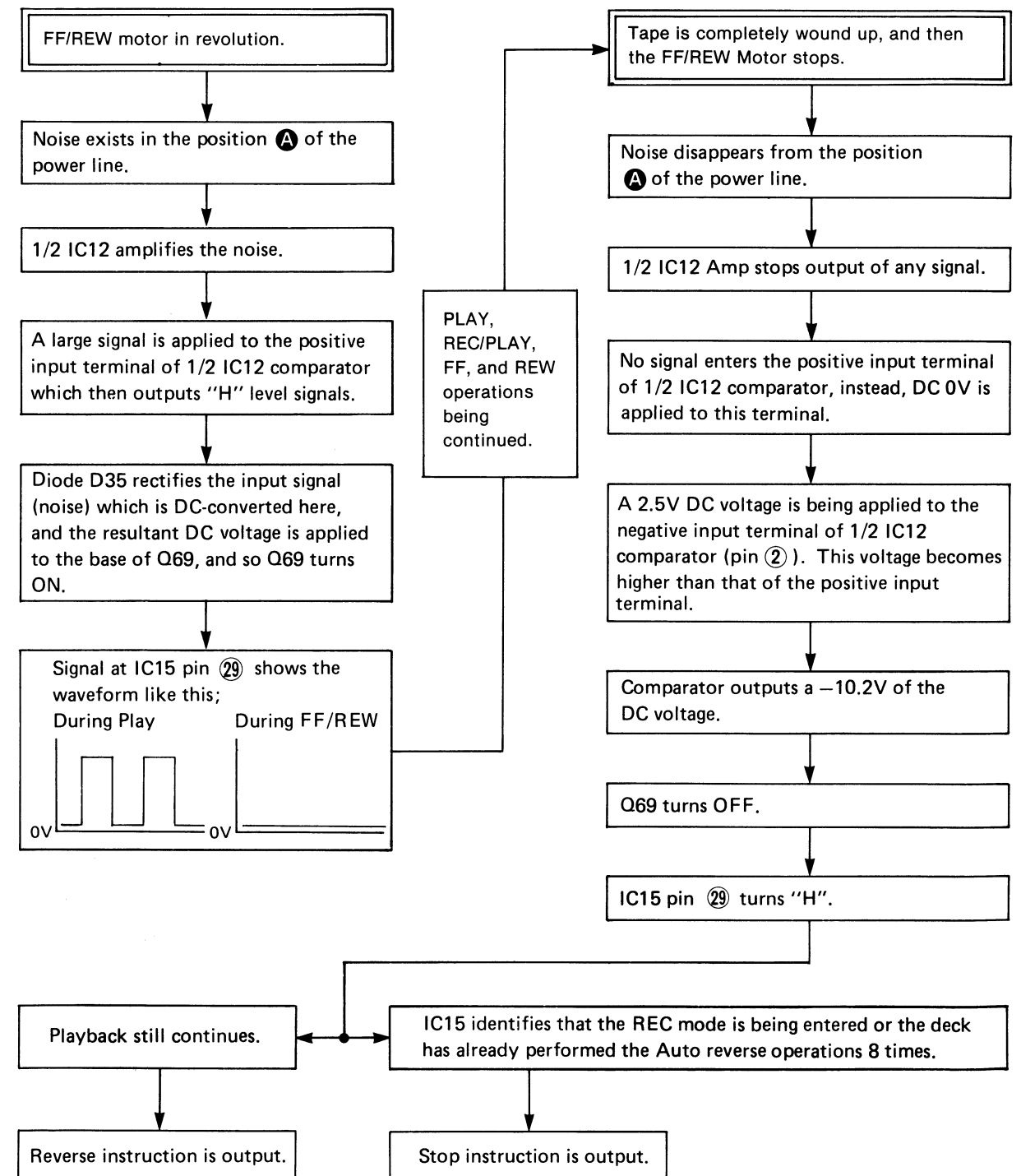


Fig. 1 The tape-end detection circuit

Operations of the Tape-end detection circuit is described below. Refer to Fig. 1 above. Transistor Q79 feeds the power to the FF/REW Motor. While the FF/REW Motor revolves, due to intermittent current flowing to the amateur coil, noise will appear at the position **A** of the power line.

When the FF/REW Motor stops its revolution at the tape end position, the current flowing through the amateur coil becomes stable, and so the noise at the position **A** of the power line disappears. IC12 (M5218L) amplifies such noise while it still exists in the power line, then compares the signals versus the amplified noise, which is then rectified to be converted into a DC voltage and then sent to the microcomputer IC15 SNS ϕ pin **(29)**.

The Tape-end detection circuit operation is sequentially shown in the Flowchart below.



REPLACING ROTARY HEAD ASSEMBLY

Considerations in mounting the rotary head assembly

1. This recorder requires a record/playback head of extremely precise head height. In replacing the rotary head, install a factory-adjusted full rotary head assembly.

[Never attempt to disassemble the rotary head assembly by removing screws (A).]

2. In installing the replacement rotary head assembly, make certain that the change gear is placed at location (B) on the change rod. (See Fig. 1.)

3. Trace the record/playback head lead-wire as follows (Refer to Fig. 2.):

- Set the record/playback head in its forward playback direction.
- Pass the head lead-wire through the lug (C) on the pressure roller arm (R) assembly.
- Slacken the wire between the head assembly and the lug (C) (by making a 5 or 6mm turnup near the lug (C)).

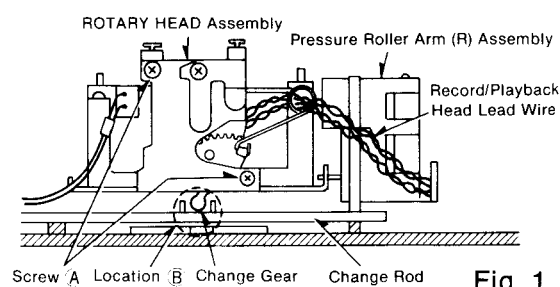


Fig. 1

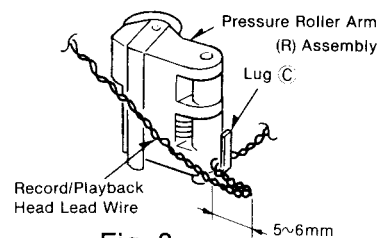


Fig. 2

MEASUREMENT AND ADJUSTMENT METHODS

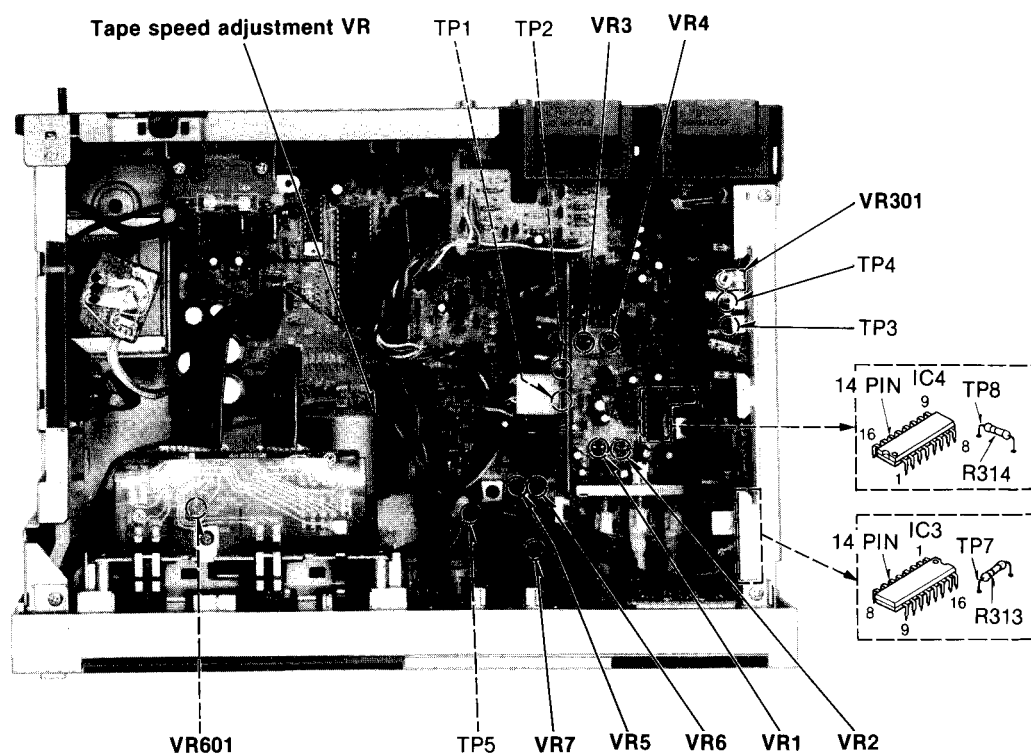


Fig. 1

NOTES: Set switches and controls in the following positions, unless otherwise specified.

- Make sure heads are clean
- Make sure capstan and pressure roller are clean
- Judgeable room temperature $20 \pm 5^\circ\text{C}$ ($68 \pm 9^\circ\text{F}$)
- NR switch: OUT
- Timer start switch: OFF
- Input level control: Maximum

A Head adjustment

Condition:

- Playback mode
- (Forward • Reverse)
- Normal tape mode

Equipment:

- VTVM
- Oscilloscope
- Test tape (azimuth)...QZZCFM
- Test tape QZZCRD

HEAD HEIGHT ADJUSTMENT

1. Turn the tape guide height adjustment screw and the erase head height adjustment screw on the rotary head assembly counter-clockwise until the upper end face of the erase head and of the tape guide are aligned on the same plane as the top face of their respective guide pins. (Refer to Figs. 2, 3 and 4).
2. Put a point ink-mark on the head of each adjustment screw.
3. With the marks as guides, turn the erase head height adjustment screw 3.2 turns clockwise and the tape guide height adjustment screw 2.5 turns clockwise.
4. Install a test tape (tape with mirror: QZZCRD) on the recorder; place the recorder in the FORWARD PLAY mode. Make fine adjustments of the erase head height and tape guide height adjustment screws as necessary, to attain on the recording/reproducing head face the tape position shown in Fig. 5.
5. Run the tape in the forward play mode and check it for zigzag running. (Shown in Fig. 5) If zigzag tape running occurs, repeat step 4.
6. Place the recorder in the reverse play mode and perform the above steps 4 and 5.
7. Repeat steps 5 and 6 two or three times and verify that the tape position shown in Fig. 5 is ensured.

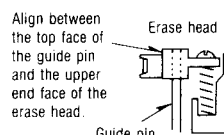
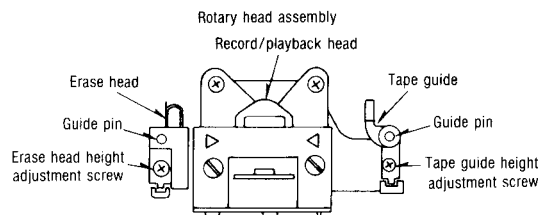


Fig. 3

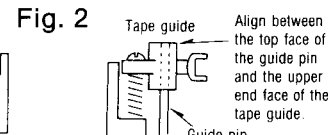


Fig. 4

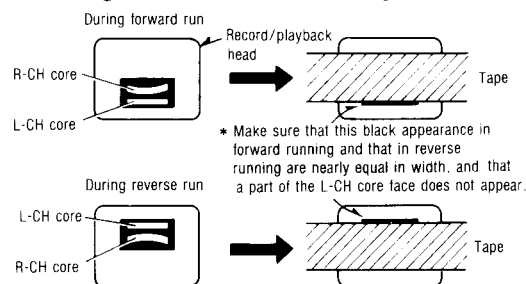


Fig. 5

L-CH/R-CH output balance adjustment

8. Make connections as shown in fig. 6.
9. In the forward playback mode, playback the 8kHz signal from the test tape (QZZCFM). Adjust the azimuth screw (Forward) shown in fig. 7 for maximum output L-CH and R-CH levels. When the output levels of L-CH and R-CH are not at maximum at the same point adjust as follows.
10. Turn the azimuth screw (Forward) shown in fig. 7 to find angles A and C (points where peak output levels for left and right channels are obtained). Then, locate angle B between angles A and C, i.e., point where L-CH and R-CH outputs are balanced. (Refer to figs. 7 and 8.)
11. In the reverse playback mode, adjust the azimuth screw (reverse) in the same way described above.

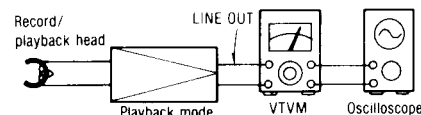


Fig. 6

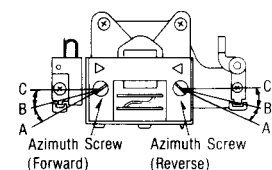


Fig. 7

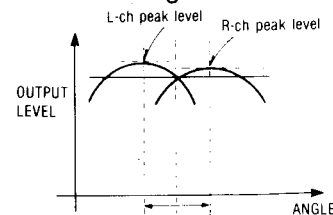


Fig. 8

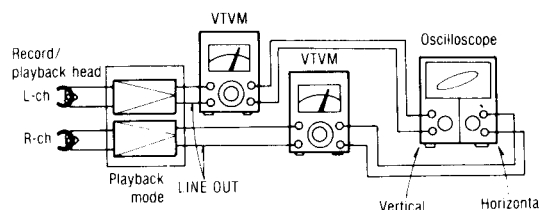


Fig. 9

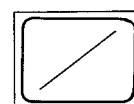


Fig. 9-1

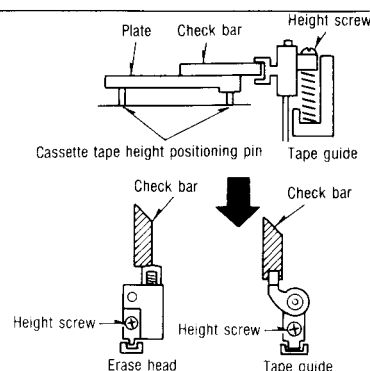
Checking the difference in level between forward and reverse running

15. Reproduce the playback level adjustment signal (315Hz at 0dB) on the standard playback adjustment tape, and check that the difference between the level in forward running and that in reverse running is within 1.0dB.
16. After adjustment, lock the erase head height, tape guide height and angle adjustment screws.

Head Height Adjustment using the Head Adjustment Jig (QZZ0207)

The head adjustment jig (QZZ0207) enables accurate, speedy head height adjustment in the following manner.

- a. Place the plate onto the mechanism.
- b. Set the mechanism to the PLAY mode.
- c. Place the check bar onto the plate.
- d. Pass the check bar through each tape guide.
- e. Adjust the height screw so that the check bar does not touch any of the tape guides.
- f. Run a mirror tape (QZZCRD) and check to see that the tape does not touch (twist around, etc.) the tape guide.
- g. After that, adjust items 4 thru 13 in the adjustment procedure.

**Ⓔ Takeup torque**

Condition:
• Playback mode

Equipment:
• DC voltmeter
• Test tape...QZZSRKCT

1. Adjust the takeup torque adjusting potentiometer VR601 in the forward playback mode for 3.5 volts between the FF/REW motor terminals.
2. Run the QZZSRKCT takeup torque measurement tape in the forward playback mode and check that the torque is within quoted tolerances.

Standard value: 50±10gr-cm

Ⓒ Tape speed

Condition:
• Playback mode

Equipment:
• Digital frequency counter
• Test tape...QZZCWAT

Tape speed accuracy

1. Test equipment connection is shown in fig. 10.
2. Playback test tape (QZZCWAT 3,000Hz), and supply playback signal to the digital frequency counter.
3. Measure this frequency.
4. On the basis of 3,000Hz, determine value by following formula:

$$\text{Tape speed accuracy} = \frac{f - 3,000}{3,000} \times 100(\%) \quad \text{where, } f = \text{measured value}$$
5. Take measurement at middle section of tape.

Standard value: ±1.5%

6. If measured value is not within the standard value, adjust it by using the tape speed adjustment VR shown in Fig. 1.

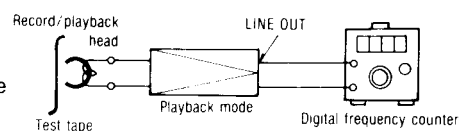


Fig. 10

Tape speed fluctuation

Make measurements in same manner as above (beginning, middle and end of tape), and determine the difference between maximum and minimum values and calculate as follows:

$$\text{Tape speed fluctuation} = \frac{f_1 - f_2}{3,000} \times 100(\%) \quad f_1 = \text{maximum value, } f_2 = \text{minimum value}$$

Standard value: Less than 1%

NOTE:

Please use non metal type screwdriver when you adjust tape speed on this unit.

㊦ Playback frequency response

Condition:

- Playback mode (Forward, Reverse)
- Normal tape mode

Equipment:

- VTVM
- Oscilloscope
- Test tape...QZZCFM

1. Test equipment connection is shown in fig. 5.
2. Playback the frequency response portion of test tape (QZZCFM).
3. Measure output level at 315Hz, 12.5kHz, 8kHz, 4kHz, 1kHz, 250Hz, 125Hz and 63Hz, and compare each output level with the standard frequency 315Hz, at LINE OUT.
4. Make measurements for both channels.
5. Make sure that the measured values are within the range specified in the frequency response chart. (Shown in fig. 11).

Playback frequency response (Forward • Reverse)

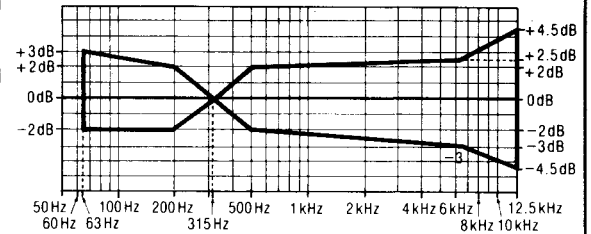


Fig. 11

㊦ Playback gain

Condition:

- Playback mode
- Normal tape mode

Equipment:

- VTVM
- Oscilloscope
- Test tape...QZZCFM

1. Test equipment connection is shown in fig. 6.
2. Playback standard recording level portion on test tape (QZZCFM 315Hz) and, using VTVM, measure the output level at test points [TP7 (L-CH), TP8 (R-CH)].
3. Make measurements for both channels.

Standard value: 0.4±0.02V [around 0.42V: at test points TP7 (L-CH) and TP8 (R-CH)]

Adjustment

1. If the measured value is not within standard the adjust VR1 (L-CH) or VR2 (R-CH) (See fig. 1).
2. After adjustment, check "Playback frequency response" again.

㊦ Erase current

Condition:

- Record mode
- Metal tape mode

Equipment:

- VTVM
- Oscilloscope

1. Test equipment connection is shown in fig. 12.
2. Place UNIT into metal tape mode.
3. Press the record and pause buttons.
4. Read voltage on VTVM and calculate erase current by following formula:

$$\text{Erase current (A)} = \frac{\text{Voltage across resistor R20}}{1 (\Omega)}$$

Standard value: 155±15mA (Metal)

5. If the measured value is not within standard value, adjust VR7 (shown in fig. 1).

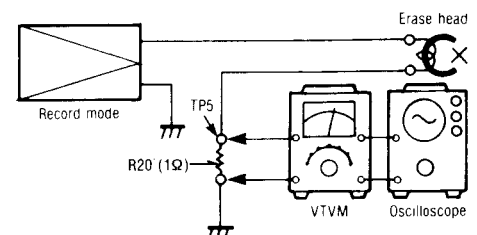


Fig. 12

㊦ Overall frequency response

Condition:

- Record/playback mode
- Normal tape mode
- CrO₂ tape mode
- Metal tape mode
- Input level control...MAX

Equipment:

- VTVM
- ATT
- AF oscillator
- Oscilloscope
- Resistor (600Ω)

- Test tape (reference blank tape)
 - ...QZZCRA for Normal
 - ...QZZCRX for CrO₂
 - ...QZZCRZ for Metal

Note:

Before measuring and adjusting, the overall frequency response make sure of the playback frequency response (For the method of measurement, please refer to the playback frequency response).

(Recording equalizer is fixed)

1. Make connections as shown in fig. 13.
2. Place UNIT into normal tape mode and insert the normal reference blank test tape (QZZCRA).
3. Supply a 1 kHz signal from the AF oscillator through ATT to LINE IN.
4. Adjust ATT so that input level is -20dB below standard recording level (standard recording level = 0 VU).
5. Adjust the AF oscillator frequency to 1 kHz, 50 Hz, 100 Hz, 200 Hz, 500 Hz, 4 kHz, 8 kHz, 10 kHz and 12.5 kHz signals, and record these signals on the test tape.
6. Playback the signals recorded in step 6, and check if the frequency response curve is within the limits shown in the overall frequency response chart for normal tapes (fig. 14).
(If the curve is within the charted specifications, proceed to steps 7, 8 and 9.)
If the curve is not within the charted specifications, adjust as follows;

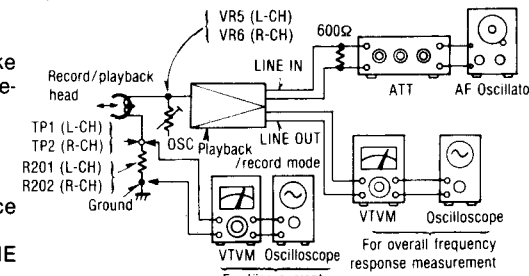


Fig. 13

Overall frequency response chart (Normal)

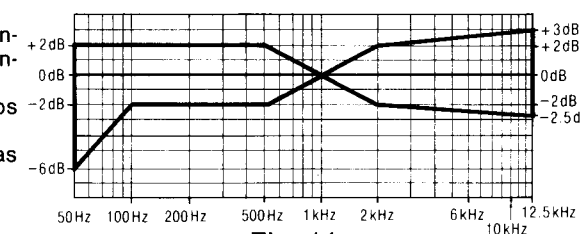


Fig. 14

Adjustment (A):

When the curve exceeds the overall specified frequency response chart (fig. 14) as shown in fig. 15.

- 1) Increase bias current by turning VR5 (L-CH) and VR6 (R-CH).
(See fig. 1 on page 9.)
- 2) Repeat steps 5 and 6 for confirmation (Proceed to steps 7, 8 and 9 if the curve is now within the charted specifications as shown fig. 14.)
- 3) If the curve still exceeds the specifications (fig. 14), increase bias current further and repeat steps 5 and 6.

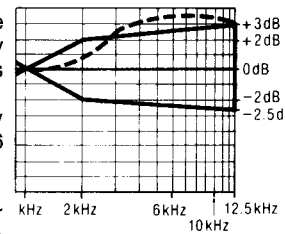


Fig. 15

Adjustment (B):

When the curve falls below the overall specified frequency response chart (fig. 14) as shown in fig. 16.

- 1) Reduce bias current by turning VR5 (L-CH) and VR6 (R-CH).
- 2) Repeat steps 5 and 6 for confirmation (Proceed to steps 7, 8 and 9 if the curve is now within the charted specifications as shown fig. 14.)
- 3) If the curve still falls below the charted specifications (fig. 14), reduce bias current further and repeat steps 5 and 6.

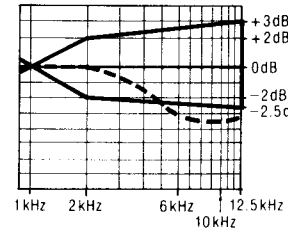


Fig. 16

Overall frequency response chart (CrO₂, Metal)

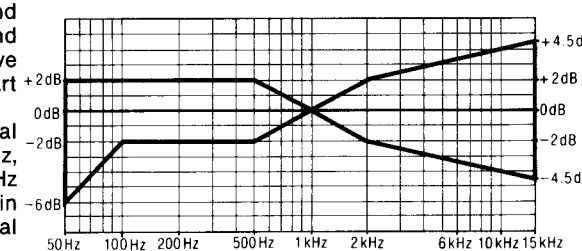


Fig. 17

7. Place UNIT into CrO₂ tape mode.
8. Change test tape to CrO₂ reference blank test tape (QZZCRX), and record 1 kHz, 50 Hz, 100 Hz, 200 Hz, 500 Hz, 4 kHz, 8 kHz, 10 kHz and 15 kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for CrO₂ tapes (fig. 17).
9. Place UNIT into metal tape mode and change test tape to metal reference blank test tape (QZZCRZ), and record 1 kHz, 50 Hz, 100 Hz, 200 Hz, 500 Hz, 4 kHz, 8 kHz, 10 kHz, 12.5 kHz and 15 kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for metal tapes (fig. 17).
10. Confirm that bias currents are approximately as follows when the UNIT is set at different tape mode.

- Read voltage on VTVM between ground and test point (TP1 for L-CH, TP2 for R-CH) and calculate bias current by following formula:

$$\text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10 (\Omega)}$$

around 200 μA (Normal position)
Standard value: around 300 μA (CrO₂ position)
around 400 μA (Metal position)

Overall gain

Condition:

- Record/playback mode
- Normal tape mode
- Input level controls...MAX
- Standard input level;
MIC $-72 \pm 4\text{ dB}$
LINE IN $-24 \pm 4\text{ dB}$

Equipment:

- VTVM
- AF oscillator
- ATT
- Oscilloscope
- Resistor (600 Ω)
- Test tape (reference blank tape) ...QZZCRA for Normal

1. Test equipment connection is shown in fig. 18.
2. Insert the normal reference blank tape (QZZCRA).
3. Place UNIT into record mode.
4. Supply a 1 kHz signal through ATT (-24dB) from AF oscillator, to LINE IN.
5. Adjust ATT until monitor level at LINE OUT becomes 0.38V .
6. Playback recorded tape, and make sure that the output level at LINE OUT becomes 0.38V .
7. If measured value is not $0.4\text{V} \pm 2\text{dB}$, adjust it by using VR3 (L-CH) or VR4 (R-CH).
8. Repeat from step (2).

Standard value: $0.4\text{V} \pm 2\text{dB}$
[around 0.42V : at test points TP7 (L-CH) and TP8 (R-CH)]

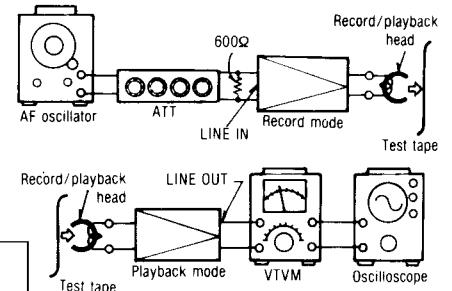


Fig. 18

Dolby NR circuit

Condition:

- Record mode
- Dolby NR switch...IN/OUT
- Input level control...MAX

Equipment:

- VTVM
- AF oscillator
- ATT
- Oscilloscope
- Resistor (600 Ω)

1. Make connections as shown in fig. 19.
2. Set the unit to the record mode. (NR select switch is OUT.)
3. Apply a 1 kHz signal to LINE IN.
4. Adjust the ATT so that the output level at TP7 (L-CH) and TP8 (R-CH) is 17.5mV .
5. The output level at pin 14 should be 0dB .
6. Set the NR select switch to IN, and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+6\text{dB} \pm 1.5\text{dB}$.
7. Set the NR select switch to OUT, and adjust the frequency to 5 kHz. The output signal level at pin 14 should be 0dB .
8. Set the NR select switch to IN and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+8\text{dB} \pm 1.5\text{dB}$.

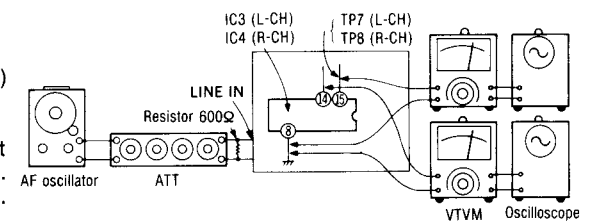


Fig. 19

Attack recovery time adjustment (dbx circuit)

Condition:

- Record mode
- Input level control...MAX
- Noise reduction selector ...dbx tape

Equipment:

- VTVM
- ATT
- AF oscillator
- DC voltmeter

1. Make the connections as shown in fig. 20 and apply 1 kHz -27dB signal from LINE IN, and set the noise reduction selector to dbx tape position.
2. Set the unit to record mode, adjust ATT so that the signal level at C361 (L-CH) and C362 (R-CH) is 300mV .
3. Read voltage on DC voltmeter.

Reference value: $15 \pm 0.5\text{mV}$

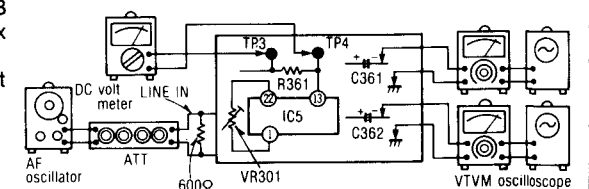


Fig. 20

4. If measured value is not within reference, adjust VR301 (shown in fig. 1).

K Input scanning time adjustment

Condition:
• Stop mode

Equipment:
• Oscilloscope

1. Place the recorder in the stop mode.
2. Connect an oscilloscope to pin 31 of IC15, as shown in Fig. 21.
3. If the measured value is not within standard value, correct it by opening or closing the jumper junctions (A) and (B) as follows (See Fig. 22):

After closing (A) and opening (B), read the resulting value.

- If it is less than 70Hz, close (B).
- If more than 120Hz, open (A) but close (B).
- If opening (A) and closing (B) do not cause the reading to be less than 120Hz, open both (A) and (B).

Standard value: $100 \pm 20_{-30} \text{ Hz (pulse frequency)}$

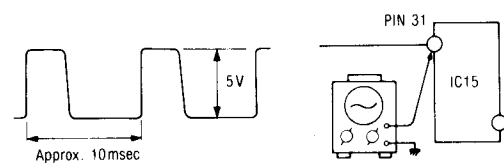


Fig. 21

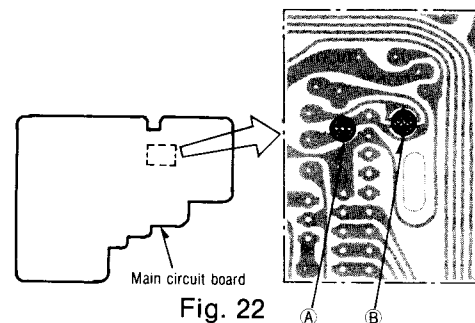


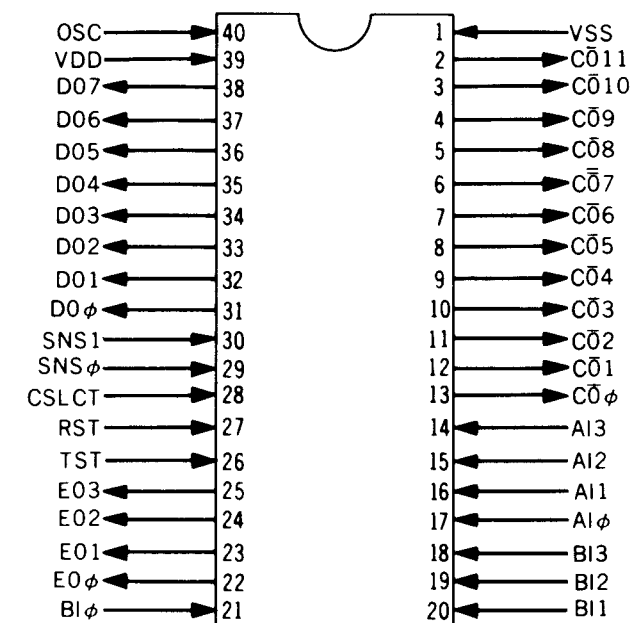
Fig. 22

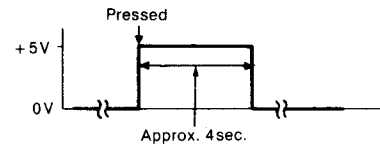
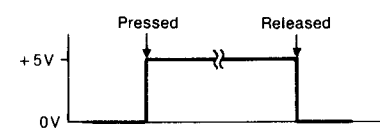
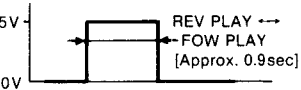
L Level meter

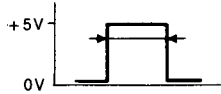
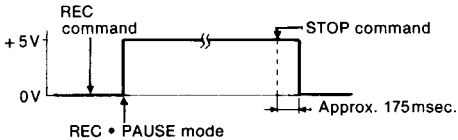
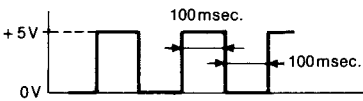
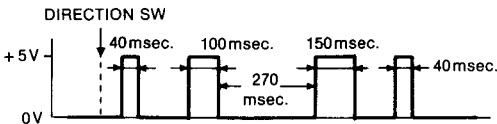
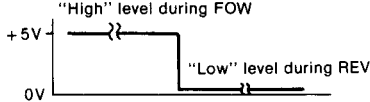
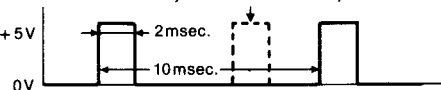
Check that the LEVEL meter LED "0" is lit when $0.4V \pm 1.5\text{dB}$ output appears at the LINE OUT terminal.

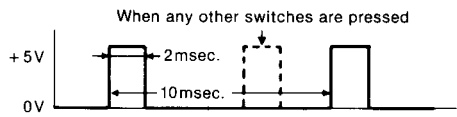
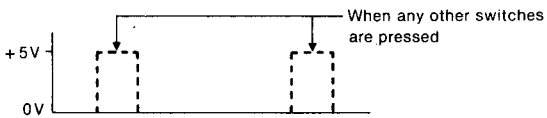
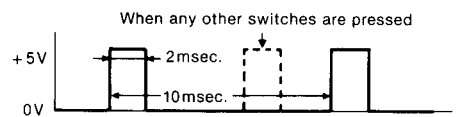
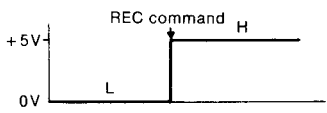
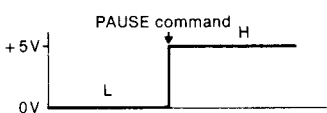
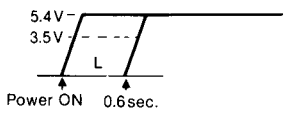
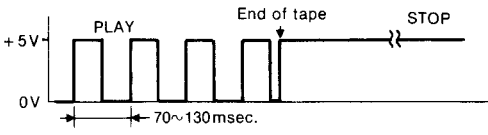
MICROCOMPUTER TERMINAL FUNCTION AND WAVEFORM

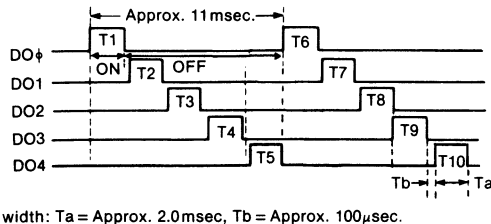
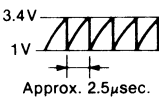
(BOTTOM VIEW)



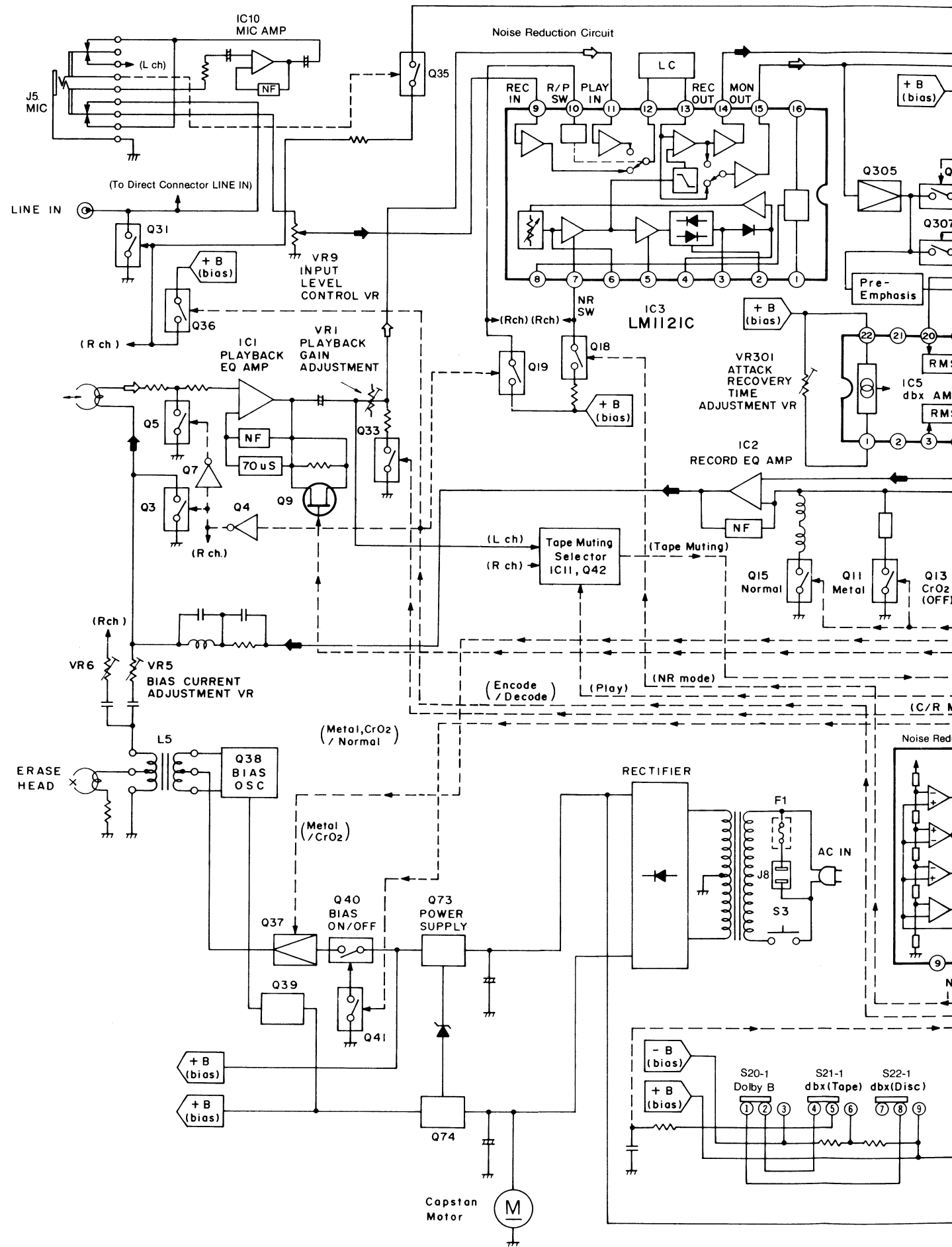
Terminal No.	Symbol	Name	Function/operation
1.	VSS	GND	
2.	CO11	Music select (M.S) command	• "High" level with music select at ON.
3.	CO10	Blank skip (B.S) command	• "High" level with blank skip at ON.
4.	CO9	Music repeat (M.R) command	• "High" level with music repeat at ON.
5.	CO8	REC MUTE	• "High" level pulse with REC MUTE button pressed during REC PLAY. 
6.	CO7	CUE/REVIEW MUTE	• "High" level pulse with CUE/REVIEW button pressed during PLAY. 
7.	CO6	Drive motor CCW rotation command	• "High" level pulse in each mode in operational sequence REV PLAY → PAUSE → STOP → FOW PLAY. • During switching between REV PLAY and FOW PLAY. 

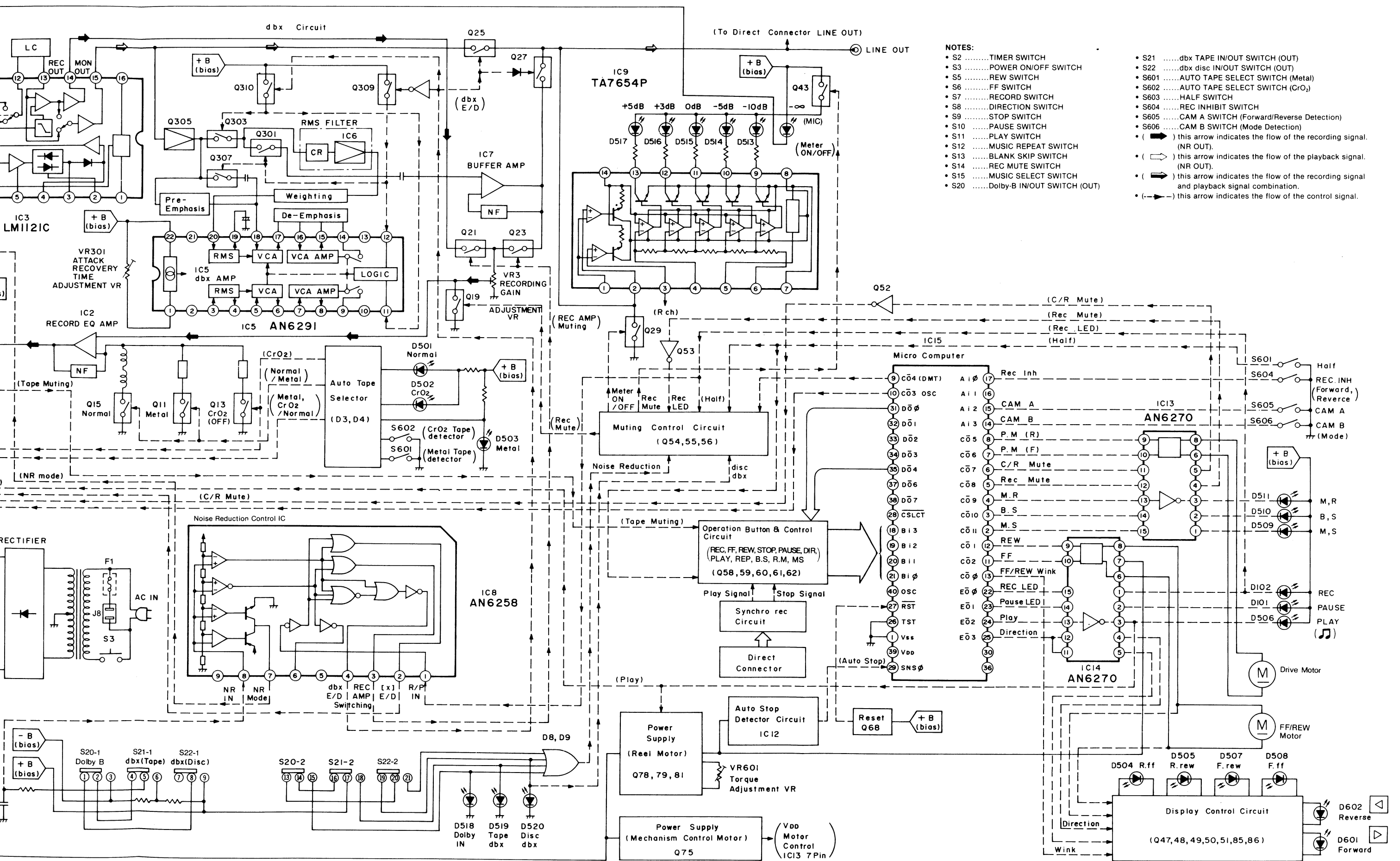
Terminal No.	Symbol	Name	Function/operation
8.	CO5	Drive motor CW rotation command	• "High" level pulse in each mode in operational sequence FOW PLAY → PAUSE → STOP → REV PLAY. 
9.	CO4	Muting for all amplifiers	• "High" level during FF, REW and STOP. • "Low" level during REC, PLAY and CUE/REV.
10.	CO3	Bias oscillation ON/OFF	• Goes to "High" immediately after REC or PAUSE operation. • Remains in "High" during REC or PLAY operation. • Goes to "Low" approximately 175msec after the STOP command is given.  REC • PAUSE mode
11.	CO2	FF/REW motor rotation select (FF/REW motor CCW rotation command)	• "High" level during: - FOW PLAY - FOW FF - REV REW
12.	CO1	FF/REW motor rotation select (FF/REW motor CW rotation command)	• "High" level during: - REV PLAY - REV FF - FOW REW
13.	CO ϕ	FF and REW blinking-indication command	• "High" level during FF and REW. 
14.	AI3	Reading of input switch state CAM B (S606)	• Input in switching-over from FOW PLAY to REV PLAY.  DIRECTION SW
15.	AI2	Reading of input switch state CAM A (S605)	 "High" level during FOW "Low" level during REV
16.	AI1	Connection to + B (bias)	
17.	AI ϕ	Reading of input switch state REC INH	• "High" level when a tape not prepared with miserase prevention masking is loaded. • "Low" level with the cassette lid open.
18.	BI3	Reading of input switch state DIR	• Waveform when the cassette lid is closed with no tape loading.  When any other switches are pressed

Terminal No.	Symbol	Name	Function/operation
19.	BI2	Reading of input switch state REC • PLAY	Waveform when the cassette lid is closed with no tape loading. 
20.	BI1	Reading of input switch state BS • PAUSE • FF	Waveform when the cassette lid is closed with no tape loading. 
21.	BIφ	Reading of input switch state BS • PAUSE • FF	Waveform when the cassette lid is closed with no tape loading. 
22.	EOφ	REC indication output	“High” level concurrently with REC command. - In TIMER REC mode, “High” level just after power on. - In TIMER REC mode, “High” level remains unchanged even if the automatic stop reset mechanism operates with power on. 
23.	EO1	PAUSE indication output	“High” level concurrently with PAUSE command. 
24.	EO2	Reel takeup torque selection and blank skip LED indication	“High” level during PLAY. “Low” level during FF, REW and STOP.
25.	EO3	DIRECTION indication output	“Low” level during FORWARD. “High” level during REVERSE.
26.	—	—	Connection to GND.
27.	RST	Reset terminal	- Terminal for reset signal to computer. - Reset at “Low” level (less than 0.8 volts). 
28.	CSLCT	—	Non connection.
29.	SNSφ	End-of-tape detection	

Terminal No.	Symbol	Name	Function/operation
30.			• Non connection.
31.	DO ϕ	Input switch scanning	 Pulse width: Ta = Approx. 2.0 msec, Tb = Approx. 100 µsec.
32.	DO1		
33.	DO2		
34.	DO3		
35.	DO4		
36.	DO5		• Non connection.
37.	DO6		
38.	DO7		
39.	VDD	Power supply terminal	• Operative on 4.6 to 6.0 volts (typically 5.5 volts).
40.	OSC	Oscillation terminal	• Generates oscillation at approximately 600kHz. • Because the connection of a probe affects the terminal, nothing should be connected to this terminal for any other measurements. • Use Dϕ to 3 in measuring the computer's velocity; Approx. 125Hz in STOP condition. 

BLOCK DIAGRAM





SCHEMATIC DIAGRAM

A
B
C
D
E
F

- D1 [MA161] D2 [RVDRD6R2EB] D3,4 [MC921]
Q1~3 2SD101R Q4 2SB1036R Q5,6 2SD1450R Q7,15,16 Q9,10 Q11~14 IC1 IC2
[2SD1011] [2SB1036] [2SD1450] [2SA1115] [2SK330GRY] [2SC2603E] [M5220L] [M5218L]

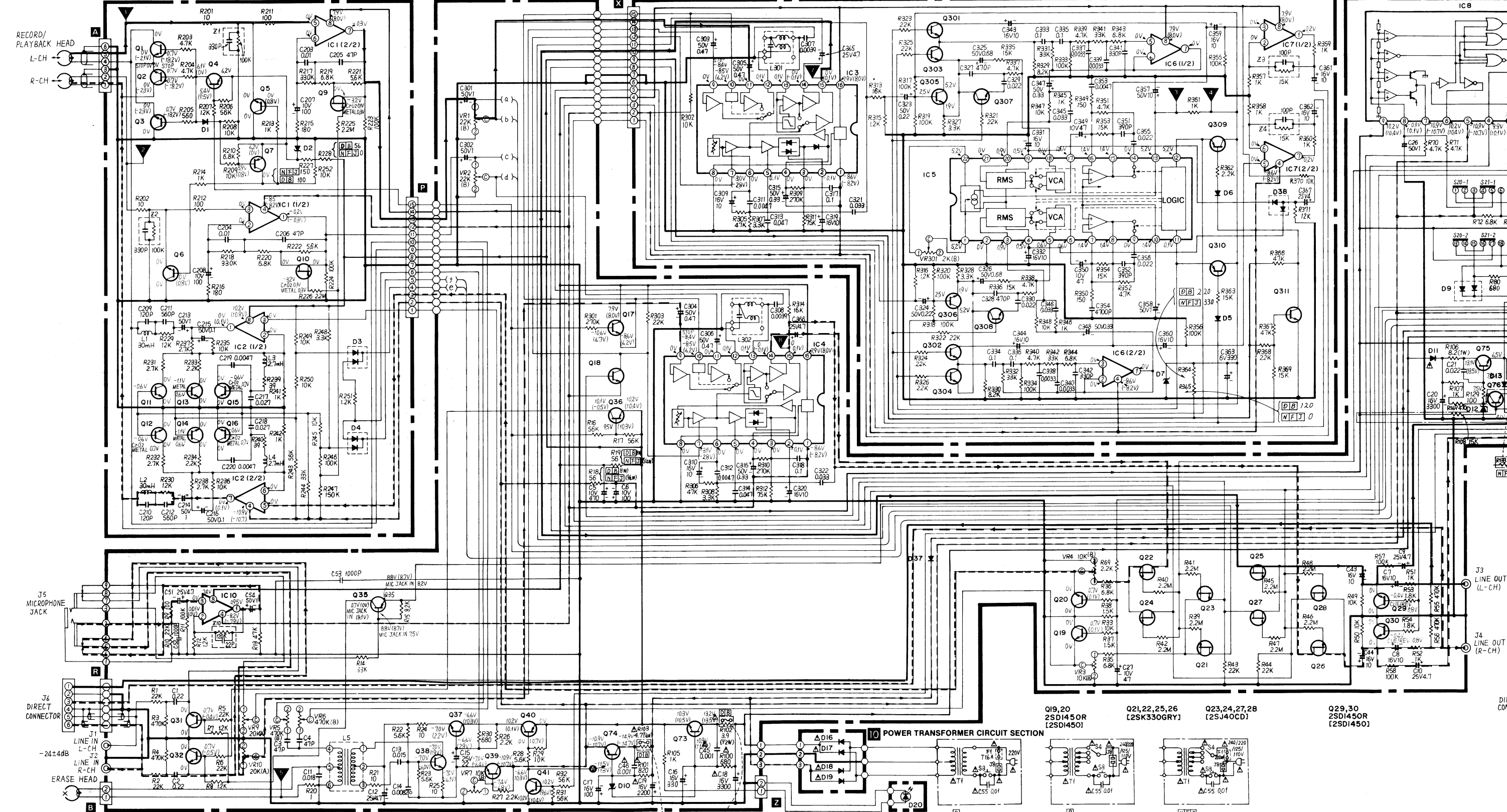
- IC3,4 [LM1121C] IC5 [AN6291] Q301~308,311 [2SC2603E] Q309,310 [2SA1115] D5,6 [MA161] D7 [MA1051] IC6,7 [M5218L] D38 [MC911] IC8 [AN6258] Q75 [2SD1275] Q78 [2SA1115] Q76 [2SC2603E] D23,24 [MC911]

3 PRE/REC AMP CIRCUIT SECTION PRE/REC AMP.

2 DOLBY NR CIRCUIT SECTION DOLBY NR AMP.

dbx AMP.

1 MAIN CIRCUIT SECTION NR CONTROL



- Q31,32 [2SC2603E] IC10 [M5218L] Q35 [2SA1115] Q37,38 2SD592NCR [2SD592] Q39 [2SA720-Q] Q36,40 [2SA1115] Q17,18,41 [2SC2603E] Q74 2SB941PQ [2SB941] D10 [RVDRD6R2EB] Q73 2SD12650P [2SD1265] D16~19 [SM112] D20 [LD702DU] D37 [SM112] Q19,20 2SD1450R [2SD1450] Q21,22,25,26 [2SK330GRY] Q23,24,27,28 [2SJ40CD] Q29,30 2SD1450R [2SD1450]

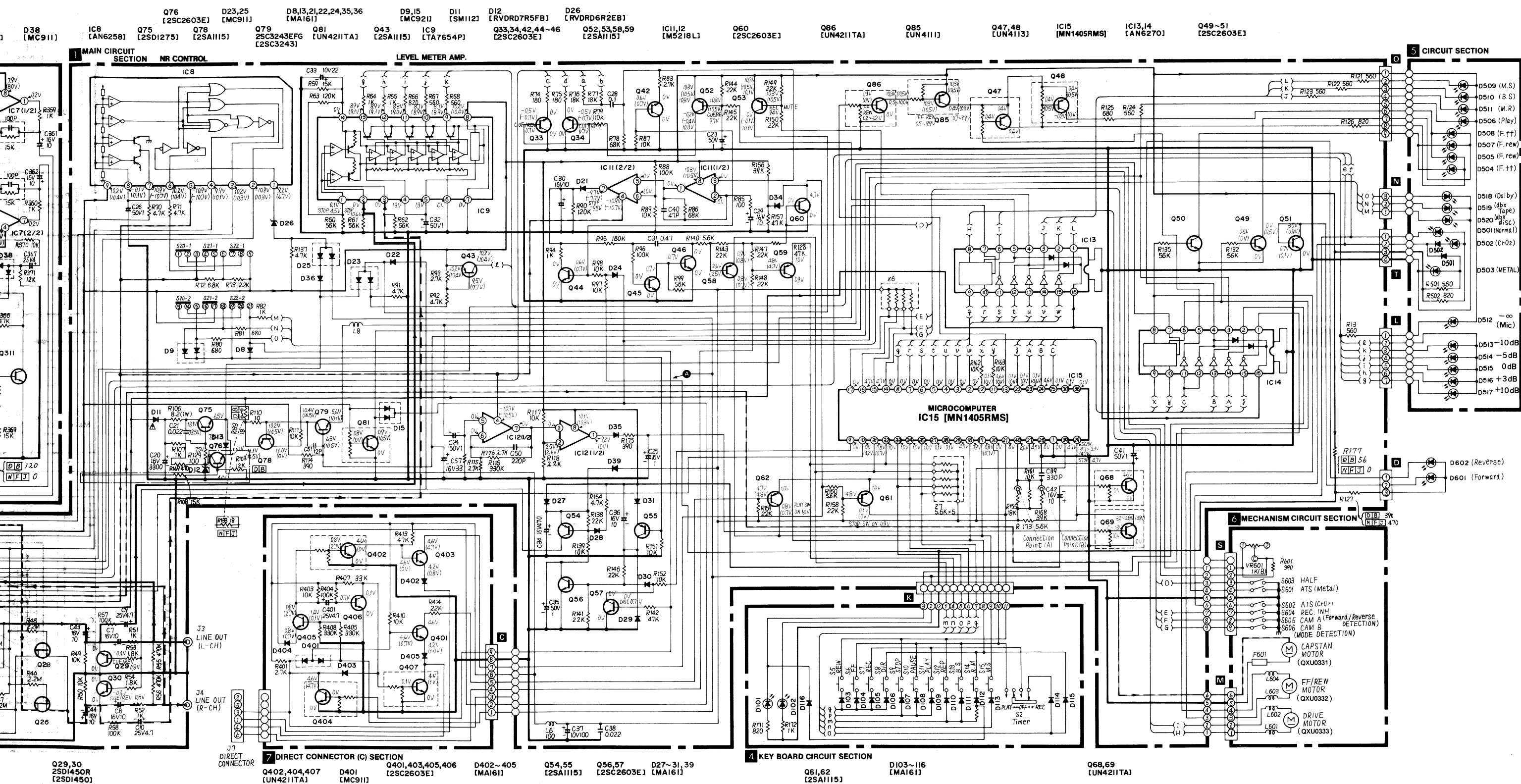


Fig. 1

CAUTION (1)

Precautions when servicing the microcomputer (IC15)

- This product includes a microcomputer (IC15), either an MN1406RMR or MN1405RMS.
- The product using the MN1405RMS must have C47 and C48 on the foil (back) side of the PC board.

The following label is placed on the MN1405RMR microcomputer.

[MN1405RMR]—[MN1405RMS] QQC2073
MN1405RMR is used in this unit. When you use a MN1405RMS, remove two of 4.7μF 25V (C47 and C48) on the foil side of the P.C.B.

- The product using the MN1405RMS does not need capacitors on the foil (back) side.

- When servicing the product which employs an MN1405RMR, remove the C47 and C48 capacitors as shown fig. 1, since only the MN1405RMS is supplied.

NOTES:

- For all European areas except United Kingdom.
- For United Kingdom.
- For Asia, Latin America, Middle East and Africa areas.
- For Asian PX.
- For European PX.

NOTES:

- S2 Timer switch (shown in 1 position).
(1...TIMER REC, 2...OFF, 3...TIMER PLAY)
- S3 Power ON/OFF switch (shown in OFF position).
- S4 AC power voltage select switch.
[G].....For United Kingdom.
[N].....For Asia, Latin America, Middle East and Africa areas.
[F][J]...For PX.
- S5 Rewind switch (shown in OFF position).
- S6 FF switch (shown in OFF position).
- S7 Record switch (shown in OFF position).
- S8 Direction switch (shown in OFF position).
- S9 Stop switch (shown in OFF position).
- S10.....Pause switch (shown in OFF position).
- S11.....Play switch (shown in OFF position).
- S12.....Music repeat switch (shown in OFF position).
- S13.....Blank skip switch (shown in OFF position).
- S14.....REC Mute switch (shown in OFF position).
- S15.....Music select switch (shown in OFF position).
- S20-1—S20-2...Dolby-B IN/OUT switch (shown in OUT position).
- S21-1—S21-2...dbx tape IN/OUT switch (shown in OUT position).
- S22-1—S22-2...dbx disc IN/OUT switch (shown in OUT position).
- S601 Auto tape select switch (for Metal tape).
- S602 Auto tape select switch (for CrO₂ tape).
- S603 Half switch (shown in OFF position).
- S604 REC inhibit switch (shown in OFF position).
- S605 Forward/Reverse detection switch (shown in OFF position).
- S606 Mode detection switch (shown in OFF position).
- VR1, 2.....Playback gain adjustment VR.
- VR3, 4.....Overall gain adjustment VR.
- VR5, 6.....Bias current adjustment VR.
- VR7 Erase current adjustment VR.
- VR9, 10 Input level controls.
- VR301 Attack recovery time adjustment VR.
- VR601 Takeup torque adjustment VR.
- Point (A), (B) ...Input scanning time adjustment.points.
- L1, 2 Bias trap adjustment coil.
- L5 Bias Oscillation coil.
- L301, 302 MPX coil.
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise.
1K = 1,000(Ω), 1M = 1,000k(Ω).
- Capacity are in micro-farads (μF) unless specified otherwise.
- The mark (▼) shows test point. e.g. ▼ = Test point 1.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position otherwise specified.
().....Voltage values at record mode.
Tape Voltage values at dbx tape mode.
disc Voltage values at dbx disc mode.
CrO₂ Voltage values at CrO₂ tape mode.
Metal Voltage values at Metal tape mode.
Stop Voltage values at Stop mode.
CUE/REV Voltage values at CUE/REV mode.
FF/REW Voltage values at FF/REW mode.
REC MUTE.....Voltage values at REC MUTE mode.
Dolby Voltage values at Dolby NR mode.
MS Voltage values at music select mode.
BS Voltage values at blank skip mode.
MR Voltage values at music repeat mode.
For measurement use VTVM.
- () indicates B + (bias).
- () indicates B - (bias).
- () indicates the flow of the playback signal. (NR out).
- () indicates the flow of the recording singal. (NR out).
- Important safety notice
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- Described in the schematic diagram are two types of numbers; the supply parts numbers and production parts number for transistors and diodes. One type of number is used for supply parts number and production parts number when they are identical.
e.g. Q1
2SC1844(E,F)——Production parts number
[2SC1844E]——Supply parts number
D212
1S2473T77——Production parts number
[MA161]——Supply parts numbers
- The supply parts number is described alone in the replacement parts list.

• This schematic diagram may be modified at any time with the development of new technology.

IC13

	Playback mode	Record mode	
1	8.6V	8.8V	MS SW ON 0V
2	8.6V	8.8V	BS SW ON 0V
3	8.6V	8.8V	MR SW ON 0V
4	10.1V	10.3V	REC MUTE 0V
5	10.1V	10.3V	CUE/REV 0V
6	0V	0V	
7	6.5V	6.5V	
8	0V	0V	
9	0V	0V	
10	0V	0V	
11	0V	0V	CUE/REV 4.5V
12	0V	0V	REC MUTE 4.5V
13	0V	0V	MR SW ON 4.6V
14	0V	0V	BS SW ON 4.5V
15	0V	0V	MS SW ON 4.5V
16	13.6V	13.9V	

IC14

	Playback mode	Record mode	
1	8.6V	0.1V	Stop 8.9V
2	8.7V	0.1V	Pause 0.1V
3	0.2V	10.1V	Stop 10.2V
4	3.3V	Reverse 0.1V	3.3V
5	0.4V	Reverse 0V	0.3V
6	5.5V	0V	FF/REW 9.6V CUE/REV 9.6V
7	5.5V	10.0V	Stop 10.1V
8	0.1V	0V	FF/REW 9.5V CUE/REV 9.5V
9	0.1V	Reverse 4.6V	FF/REW 4.6V
10	4.6V	0V	
11	0.1V	Reverse 4.6V	0.1V
12	0.1V	Reverse 4.6V	0.1V
13	4.6V	0.1V	Stop 0.1V
14	0.1V	4.6V	Pause 4.6V
15	0.1V	4.6V	Stop 0.1V
16	13.6V	13.9V	

SPECIFICATIONS * Input level controls...MAX

Playback S/N ratio * Test tape...QZZCFM	Greater than 45dB
Overall distortion * Test tape ...QZZCRA for Normal ...QZZCRX for CrO ₂ ...QZZCRZ for Metal	Less than 4%
Overall S/N ratio * Test tape...QZZCRA	Greater than 43dB (without NAB filter)

RS-8R RS-8R

Q301

	Playback mode	Record mode
B	1.9V DISC 0.5V	1.9V
C	1.3V DISC 1.2V	1.3V
E	1.3V DISC 1.9V	1.3 V

Q302

	Playback mode	Record mode
B	1.9V DISC 0.1V	1.9V
C	1.3V DISC 1.3V	1.3V
E	1.3V DISC 1.9V	1.3V

Q303

	Playback mode	Record mode
B	0.4V DISC 2.5V	0.4V
C	1.3V DISC 1.9V	1.3V
E	1.9V DISC 1.9V	1.9V

Q304

	Playback mode	Record mode
B	0.4V DISC 2.5V	0.4V
C	1.3V DISC 1.9V	1.3V
E	1.9V DISC 1.9V	1.9V

Q307

	Playback mode	Record mode
B	2.6V DISC 0.5V	2.6V
C	1.9V DISC 1.9V	1.9V
E	1.9V DISC 1.0V	1.9V

Q308

	Playback mode	Record mode
B	2.5V DISC 0.5V	2.5V
C	1.9V DISC 1.9V	1.9V
E	1.9V DISC 1.0V	1.9V

Q309

	Playback mode	Record mode
B	4.5V DISC 4.8V	4.5V
C	5.2V DISC 5.2V	5.2V
E	5.2V DISC 0.5V	5.2V

Q310

	Playback mode	Record mode
B	4.7V DISC 4.5V	4.8V
C	5.2V DISC 5.2V	5.2V
E	0.4V DISC 5.2V	0.4V

Q311

	Playback mode	Record mode
B	0.7V DISC -2.4V	0.7V
C	0.1V DISC 10.1V	0.1V
E	0V DISC 0V	0V

Q50

	Playback mode	Record mode
B	0.1V Reverse 0.6V	0V
C	0.5V Reverse 0V	0.5V
E	0V Reverse 0V	0V

Q18

	Playback mode	Record mode
B	-10.9V Dolby -7.6V	-10.7V Dolby -7.3V
C	-3.0V Dolby -8.3V	-2.8V Dolby -8.0V
E	-8.6V Dolby -8.3V	-8.2V Dolby -8.0V

Q21

	Playback mode	Record mode
D	0.1V Tape 0.1V	0.1V Tape 0V
G	0.6V Tape -9.0V	0.7V Tape -8.8V
S	0.1V Tape 0V	0.1V Tape 0V

Q22

	Playback mode	Record mode
D	0.1V Tape 0V	0.1V Tape 0V
G	0.6V Tape -8.8V	0.7V Tape -8.8V
S	0.1V Tape 0V	0.1V Tape 0V

Q23

	Playback mode	Record mode
D	0V Tape 0V	0V Tape 0V
G	8.4V Tape -0.5V	8.5V Tape -0.5V
S	0.1V Tape 0V	0.1V Tape 0V

Q24

	Playback mode	Record mode
D	0V Tape 0V	0V Tape 0V
G	8.4V Tape -0.5V	8.4V Tape -0.5V
S	0.1V Tape 0V	0.1V Tape 0V

Q25

	Playback mode	Record mode
D	0V Tape 0V	0.1V Tape 0V
G	0.5V Tape -8.9V	0.7V Tape -8.9V
S	0V Tape 0.1V	0.1V Tape 0.1V

Q26

	Playback mode	Record mode
D	0V Tape 0V	0.1V Tape 0V
G	0.5V Tape -8.9V	0.7V Tape -8.9V
S	0V Tape 0.1V	0.1V Tape 0.1V

Q27

	Playback mode	Record mode
D	0V Tape 0V	0V Tape 0V
G	8.1V Tape -0.5V	8.3V Tape -0.5V
S	0V Tape 0V	0.1V Tape 0V

Q28

	Playback mode	Record mode
D	0V Tape 0V	0V Tape 0V
G	8.1V Tape -0.5V	8.3V Tape -0.5V
S	0V Tape 0V	0.1V Tape 0V

Q54

	Playback mode	Record mode	Stop
B	9.9V DISC 10.2V	10.1V DISC 10.2V	9.0V
C	0.3V DISC -0.1V	-0.2V DISC -0.1V	9.7V
E	10.0V DISC 10.2V	10.2V DISC 10.2V	9.8V

Q56

	Playback mode	Record mode	Stop
B	0V DISC 0V	0V DISC 0V	0.7V
C	9.9V DISC 10.2V	10.1V DISC 10.2V	0V
E	0V	0V	

Q55

	Playback mode	Record mode	Stop
B	10.3V Tape 9.9V	10.5V Tape 9.9V	
C	0V Tape 0.7V	0V Tape 0.7V	
E	10.0V	10.2V	10.3V

ELECTRICAL PARTS LIST

NOTES: RESISTORS

ERD.....Carbon
ERG.....Metal-oxide
ERS.....Metal-oxide
ERO.....Metal-film
ERX.....Metal-film
ERQ.....Fuse type metallic
ERC.....Solid
ERF.....Cement

CAPACITORS

ECBA.....Ceramic
ECG.....Ceramic
ECK.....Ceramic
ECC.....Ceramic
ECF.....Ceramic
ECQM.....Polyester film
ECQE.....Polyester film
ECQF.....Polypropylene

ECE.....Electrolytic
ECE.....Non polar electrolytic
EQS.....Polystyrene
ECS.....Tantalum
QCS.....Tantalum

REPLACEMENT PARTS LIST

Important safety notice
Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.
RESISTORS											
R 1, 2	ERD25TJ223	R 94	ERD25FJ102	R 171	ERD25FJ821	R 362	ERD25FJ222	C 207, 208	ECEA1AS101	Q 43	2SA1115
R 3, 4	ERD25TJ474	R 95	ERD25TJ184	R 172	ERD25FJ102	R 363	ERD25TJ153	C 209, 210	ECKD2H121KB	Q 44, 45, 46	2SC2603E
R 5, 6	ERD25TJ223	R 96	ERD25TJ104	R 173, 174	ERD25FJ562	R 364	ERD25FJ331	C 211, 212	ECKD1H561KB	Q 47, 48	UN4113
R 7, 8	ERD25FJ122	R 97, 98	ERD25FJ103	R 175	ERD25FJ391	R 366, 367	ERD25TJ473	C 213, 214	ECEA50Z1	Q 49, 50, 51	2SC2603E
R 9	ERD25FJ101	R 99	ERD25TJ563	R 201, 202	ERD25FJ100	R 368	ERD25TJ223	C 215, 216	ECEA1HS0R1	Q 52, 53, 54, 55	
R 10	ERD25TJ223	R 100	ERD25FJ681	R 203, 204	ERD25FJ472	R 369	ERD25TJ153	C 217, 218	ECQV1H273JZ		
R 11	ERD25TJ104	R 101	ERD25FJ821	R 205	ERD25FJ561	R 370	ERD25TJ103				
R 12	ERD25FJ122	R 102		R 206	ERD25TJ563			C 219, 220	ECFDD472KVY	Q 56, 57	2SC2603E
R 13	ERD25TJ473	R 103	[DB] Δ ERQ12HJ3R9 [For all European areas.]	R 207	ERD25TJ123	R 371	ERD25TJ123	C 301, 302	ECEA50Z1	Q 58, 59	2SA1115
R 13	ERD25FJ561	R 104	[NFJ] Δ ERX12ANJ3R9 [For PX. For Asia, Latin America, Middle East and Africa areas.]	R 208, 209	ERD25FJ103	R 401	ERD25FJ272	C 303, 304, 305, 306	ECEA50Z1	Q 60	2SC2603E
		R 105	[DB] Δ ERD2FCJ4R7 [For all European areas.]	R 210	ERD25FJ682	R 403	ERD25FJ103	C 307, 308	ECFDD392KVY	Q 61, 62	2SA1115
R 14	ERD25TJ333	R 106	[NFJ] Δ ERD25FJ560 [For PX. For Asia, Latin America, Middle East and Africa areas.]	R 211, 212	ERD25FJ101	R 404	ERD25TJ104	C 309, 310	ECEA1HS100	Q 68, 69	UN4211TA
R 15	ERD25FJ822	R 107	[DB] Δ ERD25FJ102 [For all European areas.]	R 213, 214	ERD25FJ102	R 405	ERD25TJ334	C 311, 312	ECQV1H472JZ	Q 73	2SD1265
R 16, 17	ERD25FJ563	R 108	[DB] Δ ERD25TJ153 [For all European areas.]	R 215, 216	ERD25FJ181	R 407	ERD25TJ333	C 313, 314	ECQV1H473JZ	Q 74	2SB941
R 18	[DB] ERG1ANJ560 [For all European areas.]	R 109	[NFJ] Δ ERD25FJ3R9 [For PX. For Asia, Latin America, Middle East and Africa areas.]	R 217, 218	ERD25TJ334	R 408	ERD25TJ334	C 315, 316	ECEA50MR33R	Q 75	2SD1275
R 19	[DB] ERG1ANJ560 [For all European areas.]	R 110	[DB] Δ ERD25FJ102 [For all European areas.]	R 219, 220	ERD25FJ682	R 410	ERD25FJ103	C 317, 318	ECQV1H104JZ	Q 76	[DB] 2SC2603E
R 20	ERD25FJ1R0	R 111	[DB] Δ ERD25FJ102 [For all European areas.]	R 221, 222	ERD25FJ562	R 413	ERD25TJ473	C 319, 320	ECEA1HS100		
R 21	ERD25FJ100	R 112	[DB] Δ ERD25FJ102 [For all European areas.]	R 223, 224	ERD25TJ104						
R 22, 23	ERD25FJ562	R 113	[DB] Δ ERD25FJ102 [For all European areas.]	R 225, 226	ERD25TJ225						
R 24, 25	ERD25FJ100	R 114	[DB] Δ ERD25FJ102 [For all European areas.]	R 227	[DB] ERD25FJ101 [For all European areas.]						
R 26, 27	ERD25FJ222	R 115	[DB] Δ ERD25FJ102 [For all European areas.]								
R 28	ERD25FJ562	R 116	[DB] Δ ERD25FJ102 [For all European areas.]								
R 29	ERD25FJ103	R 117	[DB] Δ ERD25FJ102 [For all European areas.]								
R 30	ERD25FJ681	R 118	[DB] Δ ERD25FJ102 [For all European areas.]								
R 31, 32	ERD25TJ563	R 119	[DB] Δ ERD25FJ102 [For all European areas.]								
R 33	ERD25FJ103	R 120	[DB] Δ ERD25FJ102 [For all European areas.]								
R 35, 36	ERD25FJ682	R 121, 122, 123, 124	[DB] Δ ERD25FJ102 [For all European areas.]								
R 37, 38	ERD25FJ152	R 125	[DB] Δ ERD25FJ102 [For all European areas.]								
R 39, 40, 41, 42	ERD25TJ225	R 126	[DB] Δ ERD25FJ102 [For all European areas.]								
R 43, 44	ERD25TJ223	R 127	[DB] Δ ERD25FJ102 [For all European areas.]								
R 45, 46, 47, 48	ERD25TJ225	R 128	[DB] Δ ERD25FJ102 [For all European areas.]								
R 49, 50	ERD25FJ103	R 129	[DB] Δ ERD25FJ102 [For all European areas.]								
R 51, 52	ERD25FJ102	R 130	[DB] Δ ERD25FJ102 [For all European areas.]								
R 53, 54	ERD25FJ182	R 131	[DB] Δ ERD25FJ102 [For all European areas.]								
R 55, 56	ERD25TJ474	R 132	[DB] Δ ERD25FJ102 [For all European areas.]								
R 57, 58	ERD25TJ104	R 133	[DB] Δ ERD25FJ102 [For all European areas.]								
R 59	ERD25TJ153	R 134	[DB] Δ ERD25FJ102 [For all European areas.]								
R 60, 61, 62	ERD25TJ563	R 135, 136	[DB] Δ ERD25FJ102 [For all European areas.]								
R 63	ERD25TJ124	R 137	[DB] Δ ERD25FJ102 [For all European areas.]								
R 64, 65	ERD25FJ102	R 138	[DB] Δ ERD25FJ102 [For all European areas.]								
R 66	ERD25FJ821	R 139	[DB] Δ ERD25FJ102 [For all European areas.]								
R 67, 68	ERD25FJ561	R 140	[DB] Δ ERD25FJ102 [For all European areas.]								
R 69	ERD25FJ222	R 141	[DB] Δ ERD25FJ102 [For all European areas.]								
R 70, 71	ERD25FJ472	R 142	[DB] Δ ERD25FJ102 [For all European areas.]								
R 72	ERD25FJ682	R 143	[DB] Δ ERD25FJ102 [For all European areas.]								
R 73	ERD25FJ222	R 144, 145, 146, 147, 148, 149, 150	[DB] Δ ERD25FJ102 [For all European areas.]								
R 74, 75	ERD25FJ181	R 151, 152	[DB] Δ ERD25FJ102 [For all European areas.]								
R 76, 77	ERD25TJ183	R 153	[DB] Δ ERD25FJ102 [For all European areas.]								
R 78	ERD25TJ683										
R 79	ERD25FJ103										
R 80	ERD25FJ681										
R 81, 82	ERD25FJ102										
R 83	ERD25FJ272										
R 85	ERD25FJ101										
R 86	ERD25TJ683										
R 87	ERD25FJ103										
R 88	ERD25TJ104										
R 89	ERD25FJ103										
R 90	ERD25TJ124										
R 91, 92	ERD25FJ472										
R 93	ERD25FJ272										

VARIABLE RESISTORS

VR 1, 2 QVNB3A00B223
VR 3, 4 QVNB3A00B103
VR 5, 6 QVNB3A00B474
VR 7 QVNB3A00B103
VR 9, 10 QVNB3A00B474
VR 301 EVNM0A00B23
VR 601 EVNM4A00B13

CAPACITORS

C 1, 2 ECQV1H224JZ
C 3, 4 ECCD1H470K
C 5 ECEA1AS471
C 6 ECEA1AS101
C 7, 8 ECEA1HS100
C 9, 10 ECEA25Z4R7
C 11 ECQV1H333JZ
C 12 ECEA25Z4R7
C 13 ECQV1H333JZ
C 14 ECQV1H333JZ

C 15 ECEA1ES220
C 16 ECEA1AS331
C 17 Δ ECEA1ES101
C 18 Δ ECEA1ES332
C 19 Δ ECEA1CS222
C 20 ECEA1ES332
C 21 ECKD1H223ZF
C 23, 24, 25 ECEA50Z1

C 26 ECEA1HN010
C 27 ECEA1AS470

C 28 ECQV1H104JZ
C 29, 30 ECEA1HS100
C 31 ECQV05474JZ
C 32 ECEA50Z1
C 33 ECEA1ES220
C 34 ECEA1CS471
C 35 ECEA50Z1
C 36 ECEA1HS100
C 37 ECEA1AS101
C 38 ECKD1H223ZF

C 39 ECCD1H331J
C 40 ECCD1H470K
C 41 ECEA50Z1
C 42 ECEA1HS100
C 43 ECKD2H472PE
C 43, 44 ECEA1HS100
C 45, 46 Δ ECKD1H102MD
C 50 ECKD1H221KB
C 51 ECCD1H120J
C 52, 53 ECKD1H102MD

C 54 ECEA50Z1
C 55 Δ ECQV2A103MF
C 203, 204 ECQV1H103JZ
C 205, 206 ECCD1H470K

SPARK KILLERS

Z 1, 2 EXRP331K104
Z 3, 4 EXRP101K153
Z 6 EXBEQ4392K
Z 7 EXBEQ5562K
Z 10 EXRP220K124

TRANSISTORS

Q 1, 2, 3 2SD1011
Q 4 2SB1036
Q 5, 6 2SD1450
Q 7 2SA1115
Q 9, 10 2SK330GRY
Q 11, 12, 13, 14 2SC2603E

Q 15, 16 2SA1115
Q 17, 18 2SC2603E
Q 19, 20 2SD1450
Q 21, 22 2SK330GRY

Q 23, 24 2SJ40CD
Q 25, 26 2SK330GRY
Q 27, 28 2SJ40CD
Q 29, 30 2SD1450
Q 31, 32, 33, 34 2SC2603E

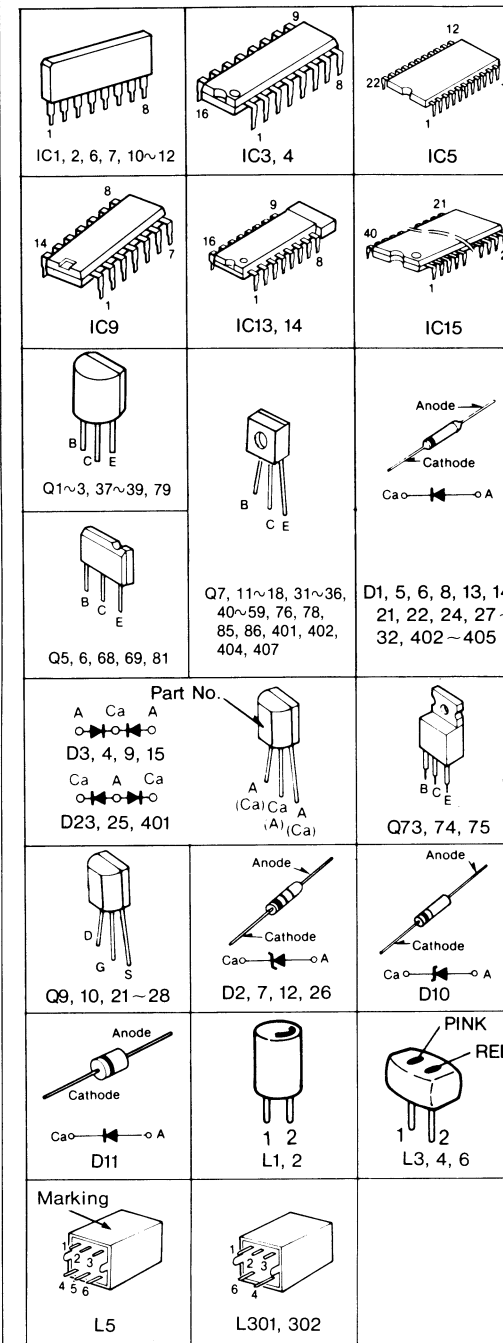
Q 35, 36 2SA1115
Q 37, 38 2SD592
Q 39 2SA720-Q
Q 40 2SA1115
Q 41, 42 2SC2603E

INTEGRATED CIRCUITS

IC 1 M5220L
IC 2 M5218L
IC 3, 4 LM1121C
IC 5 AN6291
IC 6, 7 M5218L
IC 8 AN6258
IC 9 TA7654P
IC 10, 11, 12 M5218L
IC 13, 14 AN6270
IC 15 MN1405RMS

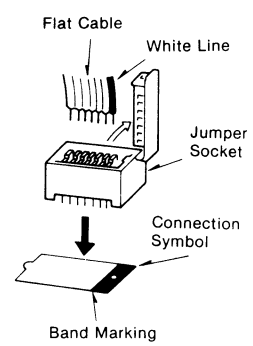
Ref. No.	Part No.	Part Name & Description
COILS		
L 1, 2	QLQX0343KWA	Trap Coil
L 3, 4	QLQX2722D	Coil
L 5	QLB0198	Bias Oscillation Coil
L 6	QLQX1012DT	Choke Coil
L 8	ELEH101KA	Coil
L 301, 302	QLM929K	MPX Coil
L 601, 602, 603, 604	ELEH101KA	Coil
TRANSFORMERS		
T 1 [D] Δ QLPD80ELC		Power Transformer [For all European areas except United Kingdom.]
[BNFJ] Δ QLP73ELC		Power Transformer [For PX. For United Kingdom, Asia, Latin America, Middle East and Africa areas.]
FUSES		
F 1 [D] Δ XBAQ0010		Fuse (T 1.6A) [For all European areas except United Kingdom.]
[NFJ] Δ XBA2E02NS5		Fuse (200mA) [For PX. For Asia, Latin America, Middle East and Africa areas.]
F 601	QRUF10WH	I.C. PROTECTOR
SWITCHES		
S 2	QSS1305	Slide Switch (Timer)
S 3	Δ QSW1127	Push Switch (Power ON/OFF)
S 4	[BNFJ] Δ QSR1407H	Rotary Switch (AC Power Voltage Selector) [For PX. For United Kingdom, Asia, Latin America, Middle East and Africa areas.]
S 5, 6	SSG13	Key Board Switch (F.F./REW)
S 7	QSW1124	Key Board Switch with D102 (Record)
S 8, 9	SSG13	Key Board Switch (Direction/Stop)
S 10	QSW1126	Key Board Switch with D101 (Pause)
S 11, 12, 13, 14, 15	SSG13	Key Board Switch (Play/Music Repeat/Blank Skip/Rec Mute/Music Select)
S 20, 21, 22	QSWX415	Push Switch (NR Selector)
S 601, 602, 603, 604	QSB0296	Leaf Switch (Metal tape/CrO ₂ tape/Half/Rec Inhibit)
S 605, 606	QSB0295	Leaf Switch (Forward*Reverse Detection/Mode)
JACKS		
J 1, 2, 3, 4	QEJ5030C	Jack Board (LINE IN/OUT)
J 5	QJA0262	Microphone Jack
J 6, 7	SJS9607	Direct Connector
J 8	[DNFJ] Δ SJS9225	AC Outlet [For PX. For all European areas except United Kingdom, Asia, Latin America, Middle East and Africa areas.]
[B] Δ SJS9227		AC Outlet [For United Kingdom.]
CONNECTORS		
CN 1	QJS1997S	Jumper Socket (3 Pin)
CN 2	QJS1987S	Jumper Socket (4 Pin)
CN 3	QJS1962S	Jumper Socket (7 Pin)
CN 4	QJS1988S	Jumper Socket (9 Pin)
CN 5	QJS1990S	Jumper Socket (12 Pin)
CN 6	QJT1054	Contact
CN 7	QJS1920TN	2 Pin Socket
CN 8	QJP1920TN	2 Pin Post
CN 9	QJS1921TN	3 Pin Socket
CN 10	QJP1921TN	3 Pin Post
CN 11	QJS1922TN	6 Pin Socket
CN 12	QJP1922TN	6 Pin Post
CN 13	QJS1923TN	9 Pin Socket
CN 14	QJP1923TN	9 Pin Post
CN 15	QJS1925TNL	15 Pin Socket
CN 16	QJP1925TN	15 Pin Post
CN 17	QJT1090	Check Pin
CN 18	QJS2000S	Jumper Socket (6 Pin, Type-L)
CN 19	QJS2001S	Jumper Socket (9 Pin, Type-L)

TERMINATIONS



CONNECTION OF A FLAT CABLE

Connect the flat cable to the jumper socket so that the white line on the flat cable corresponds to the band mark side of the connection symbol (yellow or white symbol on the PC board) for the jumper socket. (This connection may differ from those for conventional models.)

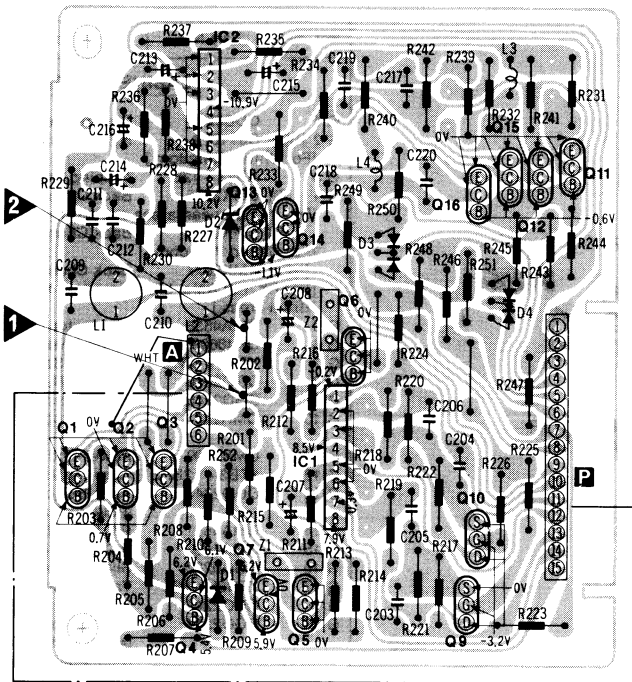


- NOTES:
- BLK Black
 - BLU Blue
 - BRN Brown
 - GRY Gray
 - GRN Green
 - L. BLU Light Blue
 - NIL No Color Mark
 - ORG Orange
 - PNK Pink
 - RED Red
 - SLD Shield Wire
 - VLT Violet
 - WHT White
 - YEL Yellow

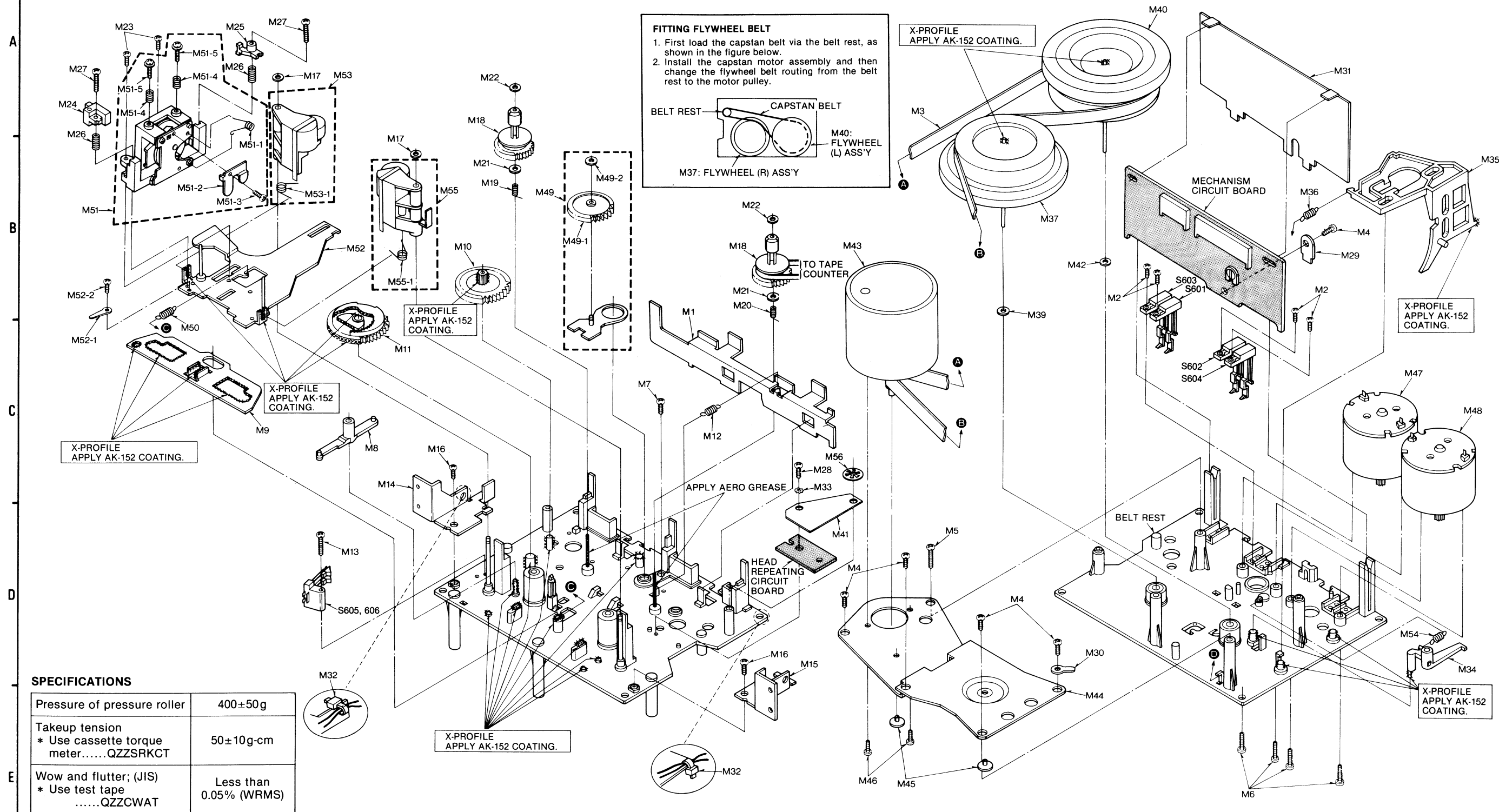
- NOTES:
- For all European areas except United Kingdom.
 - For United Kingdom.
 - For Asia, Latin America, Middle East and Africa areas.
 - For Asian PX.
 - For European PX.

- NOTES:
- The circuit shown in [symbol] on the conductor side indicates printed circuit on the back side of the printed circuit board.
 - All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position. For measurement, use VTVM.
 - This circuit board diagram may be modified at any time with the development of new technology.

3 Pre/Rec AMPLIFIER CIRCUIT BOARD



MECHANICAL PARTS LOCATION



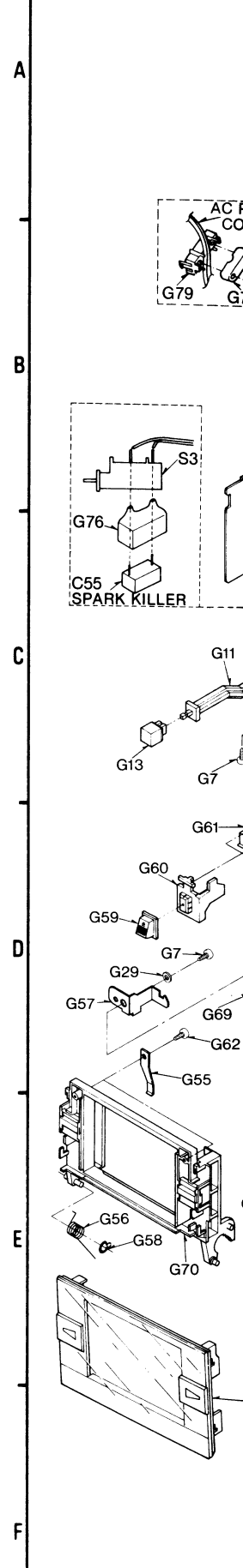
SPECIFICATIONS

Pressure of pressure roller	400±50g
Takeup tension * Use cassette torque meter.....QZZSRKCT	50±10g-cm
Wow and flutter; (JIS) * Use test tape QZZCWAT	Less than 0.05% (WRMS)

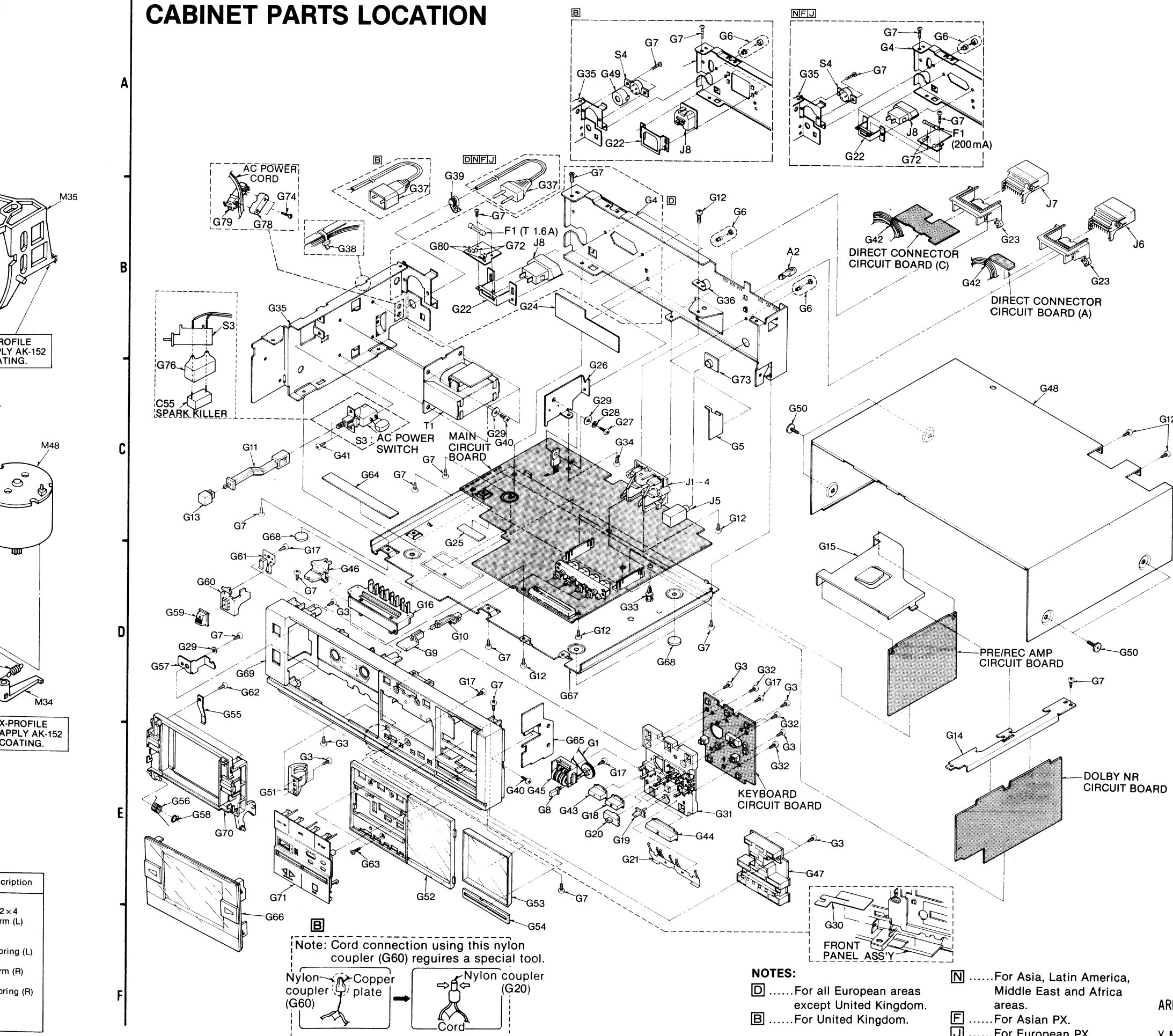
REPLACEMENT PARTS LIST

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
MECHANICAL PARTS			M 11	QDG1309	Main Gear	M 23	XTN26 + 6B	Tapping Screw $\varnothing 2.6 \times 6$	M 36	QBT1947	Head Release Spring	M 49	QXG1076	Center Gear Assembly	M 52-1	QTD1258	Lug Terminal
M 1	QMA4620	Eject Angle	M 12	QBT2003	Eject Angle Spring	M 24	QWY2148Y	Erase Head	M 37	QXF0221	Flywheel (R) Assembly	M 49-1	QDG1307	Center Gear	M 52-2	XTN2 + 4B	Tapping Screw $\varnothing 2 \times 4$
M 2	XTN2 + 8B	Tapping Screw $\varnothing 2 \times 8$	M 13	XTN2 + 18B	Tapping Screw $\varnothing 2 \times 18$	M 25	QMG0124	Tape Guide	M 39	QBW2116	Washer (2.4 ϕ)	M 49-2	QBW2007	Washer (2.5 ϕ)	M 53	QXL1654	Pressure Roller Arm (L) Assembly
M 3	QDB0347	Flywheel Belt	M 14	QMA4628	Mechanism Angle-L	M 26	QBC1448	Tape Guide Spring	M 40	QXF0220	Flywheel (L) Assembly	M 50	QBT1742	Head Base Plate Spring			
M 4	XTN3 + 8B	Tapping Screw $\varnothing 3 \times 8$	M 15	QMA4627	Mechanism Angle-R	M 27	XSN2 + 18	Screw $\varnothing 2 \times 18$	M 41	QTW1368	Cover Sheet	M 51	QXV0182	Rotary Head Assembly (Record/Playback Head)	M 53-1	QBN1992	Pressure Roller Spring (L)
M 5	XTN3 + 22B	Tapping Screw $\varnothing 3 \times 22$	M 16	XTN3 + 6B	Tapping Screw $\varnothing 3 \times 6$	M 28	XTN26 + 6B	Tapping Screw $\varnothing 2.6 \times 6$	M 42	QBW2117	Washer (2.7 ϕ)			Click Spring	M 54	QBT1962	Stop Lever Spring
M 6	XSN26 + 10	Screw $\varnothing 2.6 \times 10$	M 17	QBW2046	Washer (3 ϕ)	M 29	QBP1998	Earth Spring				M 51-1	QBN1994	Head Slide Spring	M 55	QXL1655	Pressure Roller Spring (R) Assembly
M 7	XTN3 + 6B	Tapping Screw $\varnothing 3 \times 6$	M 18	QDR1173	Reel Table	M 30	QJT0015	Lug Terminal	M 43	QXU0331	Capstan Motor Assembly	M 51-2	QBP1993	Head Spring			
M 8	QML4025	Change Lever	M 19	QBC1449	Reel Table Spring-L	M 31	QTW1342	Insulator Sheet	M 44	QMA4619	Flywheel Retainer	M 51-3	XTN2 + 4B	Screw $\varnothing 2 \times 4$			
M 9	QMR2096	Change Rod	M 20	QBC1450	Reel Table Spring-R	M 32	QTD1315	Cord Clamper	M 45	QMZ1306	Flywheel Thrust Retainer	M 51-4	QBC1422	Head Spring			
M 10	QDG1308	Sub Gear				M 33	XWC268B	Washer (2.6 ϕ)	M 46	XSN26 + 3	Screw $\varnothing 2.6 \times 3$	M 51-5	QH01352	Screw			
			M 21	QBW2012	Washer (2.1 ϕ)	M 34	QML4026	Stop Lever	M 47	QXU0332	FF/REW Motor Assembly	M 52	QXK2764	Head Base Plate Assembly	M 55-1	QBN1993	Pressure Roller Spring (R)
			M 22	QBW2008	Washer (2 ϕ)	M 35	QMR2097	Eject Rod	M 48	QXU0333	Drive Motor Assembly				M 56	QBW0048	Washer

CABINET



CABINET PARTS LOCATION



REPLACEMENT PARTS LIST

Important safety notice
Components identified by  mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	
CABINET PARTS			G 51	QYF0627	Damper Gear Holding Angle	
G 1	QDB0220	Counter Belt	G 52	QGR0195D	Display Panel (A)	
G 2 [B] Δ	QJT1079	Nylon Coupler		"Silver Type"		
[For United Kingdom.]				QGR0195K	Display Panel (A)	
G 3	XTN3 + 12B	Tapping Screw ⊕3×12	G 53	QGR0196S	Display Panel (B)	
G 4 [D]	QMK2075	Back Chassis		"Silver Type"		
[For all European areas except United Kingdom.]				QGR0196Y	Display Panel (B)	
[B]	QMK2076	Back Chassis		"Black Type"		
[For United Kingdom.]			G 54	QGG0220	Button Guide	
[NFJ] Δ	QMK2077	Back Chassis	G 55	QBP1946	Cassette Pressure Spring	
[For PX. For Asia, Latin America, Middle East and Africa areas.]			G 56	QBN2007	Holder Spring	
G 5	QMA4638	Connector Holding Angle	G 57	QMA4626	Holder Angle (L)	
G 6	QKJ0609	Nylon Rivet	G 58	XUBQ4FT	Stop Ring	
G 7	XTN3 + 8B	Tapping Screw ⊕3×8	G 59	QGO2242	Push Button (for Eject)	
G 8	QGO2250	Counter Button	G 60	QML4030	Eject Lever	
G 9	QGO2245	Push Button				
G 10	QMR2100	Switch Rod	G 61	QBP1995	Eject Spring (B)	
			G 62	XTN26 + 5BFZ	Screw ⊕2.6×5	
G 11	QMR2099	Power Rod	G 63	XTS26 + 8B	Tapping Screw ⊕2.6×8	
G 12	XTB3 + 12BFZ	Tapping Screw ⊕3×12	G 64	QTW1343	Insulator Sheet	
G 13	QGO2243	Push Button	G 65	QMA4630	Side Angle (R)	
		(Power ON/OFF)	G 66 [DB]	QYF0636	Cassette Lid Assembly	
G 14	QMA4631	P.C.B Holding Angle		"Silver Type"		
G 15	QMA4632	P.C.B Angle	[For all European areas.]			
G 16	QGG0222	Slide Guide	[DB]	QYF0636O	Cassette Lid Assembly	
G 17	XTN26 + 8B	Tapping Screw ⊕2.6×8		"Black Type"		
G 18	QGO2247	Push Button (REC MUTE)	[For all European areas.]			
G 19	QGO2244	Push Button	[NFJ]	QYF0682	Cassette Lid Assembly	
		(Music Select/Blank Skip/Music Repeat)		"Silver Type"		
G 20	QGO2249	Push Button (Timer)	[For PX. For Asia, Latin America, Middle East and Africa areas.]			
G 21	QBP1997	Push Button Pressure Spring	[NFJ]	QYF0682O	Cassette Lid Assembly	
				"Black Type"		
G 22			[For PX. For Asia, Latin America, Middle East and Africa areas.]			
[DNFJ] Δ	QMA4663	AC Outlet Angle	G 67	QYB0431	Bottom Cover Assembly	
[For PX. For all European areas except United Kingdom, Asia, Latin America, Middle East and Africa areas.]			G 68	QKA1094	Case Foot	
[B]	QMA4664	AC Outlet Angle	G 69	QYP1192D	Front Panel Assembly	
[For United Kingdom.]				"Silver Type"		
G 23	SHR9631	Direct Connector Holding Plate		QYP1192K	Front Panel Assembly	
				"Black Type"		
G 24	QTW1354	Insulator (B)	G 69-1	(refer to D20)		
G 25	QBM1335	Cushion	G 70	QYF0659	Cassette Holder Assembly	
G 26	QTH1181	Heat Sink	G 71	QYK0163	Operation Plate Assembly	
G 27	XSN3 + 8S	Screw ⊕3×8	G 72			
G 28	XWA3G	Washer 3φ		[D] Δ	QTF1054	Fuse Holder
G 29	XWG3	Washer 3φ		[For all European areas except United Kingdom.]		
G 30	QTS1612	Head Shield Sheet		[NFJ] Δ	QTF1060	Fuse Holder
				[For PX. For Asia, Latin America, Middle East and Africa areas.]		
G 31	QMK2094	Operation Chassis	G 73	QKJ0667	MIC Jack Holding Plate	
G 32	XTN26 + 8BFZ	Tapping Screw ⊕2.6×8	G 74	XTN3 + 20B	Tapping Screw ⊕3×20	
G 33	QKJ0608	Tapping Support	G 76	QTW1195	Spark Killer Cover	
G 34	XSN3 + 6BVS	Screw ⊕3×6	G 78	QTD1164	Cord Bushing	
G 35	QMA4629	Side Angle	G 79	QTD1322	Cord Clamper	
G 36	RME143Z	Cord Clamper	G 80	Δ	SJT777	Pin Terminal
G 37						
[DNFJ] Δ	SJA151	AC Power Cord				
[For PX. For all European areas except United Kingdom, Asia, Latin America, Middle East and Africa areas.]						
[B] Δ	SJA1491	AC Power Cord				
[For United Kingdom.]						
G 38	QTD1315	Cord Clamper				
G 39	QBJ1425	Cord Bushing				
G 40	XTN3 + 6B	Tapping Screw ⊕3×6				
G 41	XTN3 + 5B	Tapping Screw ⊕3×5				
G 42	QTD1181	Wire Clamper				
G 43	QXB0790	Push Button (Record)				
G 44	QXB0791	Push Button (Pause)				
G 45	QDC0162	Counter				
G 46	QYT0665	Slide Knob Assembly				
G 47	QVLDX020	LED Block Assembly				
G 48	QGC1241	Case Cover				
	"Silver Type"					
	QGC1241K	Case Cover				
	"Black Type"					
G 49 [B]	QTMW0026	Rotary Switch Cover				
[For United Kingdom.]						
G 50	QHC1349	Ornament Screw				
	"Silver Type"					
	QHQ1349K	Ornament Screw				
	"Black Type"					
			ACCESSORIES			
			A 1 [DBN]	QQT3511	Instruction Book	
				[For all European areas, Asia, Latin America, Middle East and Africa areas.]		
				[FJ] QQT3519	Instruction Book	
				[For PX.]		
			A 2	SHE135	Fixing Pin	
				"Silver Type"		
				SHE135-1	Fixing Pin	
				"Black Type"		
			PACKINGS			
			P 1 [DB]	QPN4478	Inside Carton	
				[For all European areas.]		
				[FJ] QPN4488	Inside Carton	
				[For PX.]		
				[N] QPN4487	Inside Carton	
				[For Asia, Latin America, Middle East and Africa areas.]		
			P 2	QPA0729	Cushion	
			P 3	QPA0730	Cushion	
			P 4	QPS0673	Pad	
			P 5	XZB40X50A02	Poly Bag	
			P 6	QPC0072	Poly Sheet	

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D	DK	B	BK	N	NK	F	FK	J	JK
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